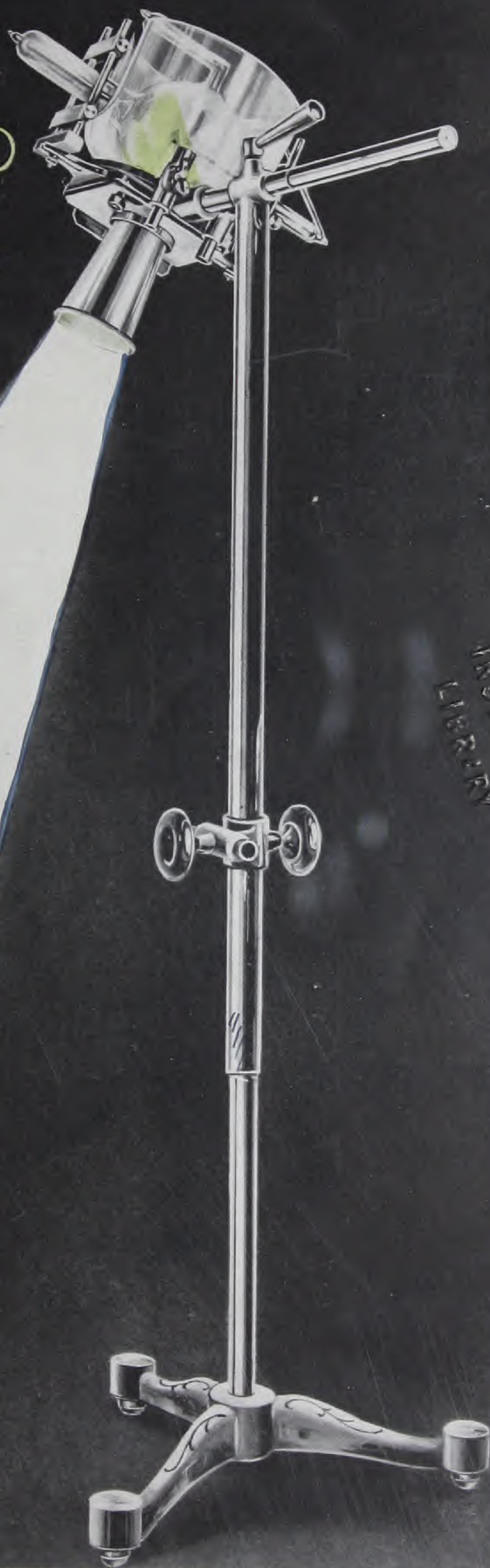


631-6. Please return to
WM. C. L. EGLIN

An X-RAY OF Light

X-K



CRANFORD
INSTITUTE
LIBRARY

All works of Quality must bear a price in proportion to the Skill, Time, Expense and Risk attending their Invention and Manufacture. Those things called dear are, when justly estimated, the cheapest.

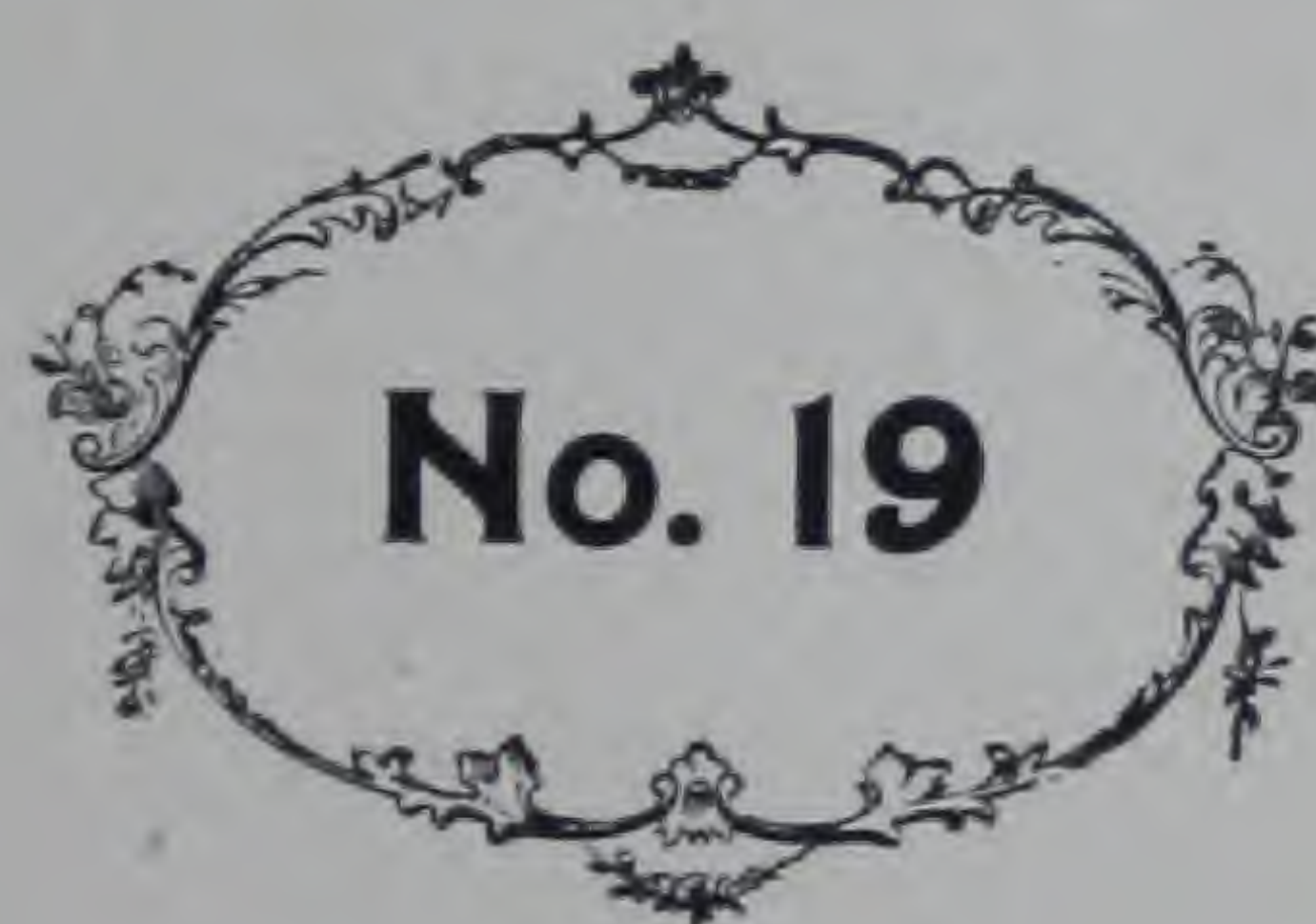
A composition for cheapness and not for excellence of Workmanship is the most frequent and certain cause of the rapid decay and entire destruction of Arts and Manufactures.

—*Ruskin.*

WOMAN'S GAZETTE



Apparatus of Precision for Correct Roentgenography



... THE ...

KELLEY-KOETT MFG. CO.

INCORPORATED

COVINGTON, KY., U. S. A.

COPYRIGHTED, 1910
BY J. ROBERT KELLEY
COVINGTON, KY.

Preface



THE Kelley-Koett Manufacturing Company with no change in name, organization or policy, has been designing and manufacturing X-Ray Apparatus exclusively since the earliest days of the industry. In fact, our Mr. Kelley has pursued the study and practice of Roentgenology since very soon after the discovery of the Ray by Prof. Roentgen in 1895.

The individual members of this firm are substantial citizens of this vicinity, who have been connected with the electrical manufacturing, banking and financial interests of Cincinnati and Covington for many years past, and while the firm is incorporated for but a nominal sum, there is ample capital available to meet every requirement of our growing domestic and export business.

In these days of specialization, manufacturers of electrical apparatus in general and even those who make a general line of electro-therapeutic appliances, will find it most difficult to divert their energies sufficiently to design *Roentgen appliances* that are either meritorious or useful. The product of such is, as a rule, mere imitations of real instruments which have been appropriated without permission from the inventions of competent designers; sufficient external but immaterial changes having been made to disguise identity and forge an appearance of originality.

As to new inventions and discoveries relative to the X-Ray itself, nothing of great importance has developed in recent years, but very marked progress has been made in perfecting the induction coil, appliances of precision for the application of the Ray and betterment of technique in handling modern appliances.

Some manufacturers are pushing the sale of certain so-called "Interrupterless" generators. We would respectfully caution our friends to not be in too great a hurry to invest their savings in such *weighty* and *very expensive* devices. Remember that the aim of science is constantly to make the road *shorter and surer* and you should thoroughly satisfy yourself as to whether "The Interrupterless" does either. Bear in mind that we do not assert that the above instrument is without merit, but; simply take into consideration, first: the number of moving parts employed, any one of which is as likely to get out of order as is a modern interrupter. Second: the weight and cost as compared with a modern coil apparatus. Third: compare results when both equipments are handled by professional operators.

The size of the various illustrations used in this book was determined by the amount of space available for their presentation and therefore has no bearing whatever as to the relative or comparative size of the instruments that they were made to represent.

At the time of issue, each K-K catalog presents our apparatus at its latest stage of perfection, but as we are not satisfied to drift with the tide by "letting well enough alone" but are ever ready to consider further improvements; our instruments may at times show a departure from the lines of the illustrations. We can not therefore, guarantee that instruments will be exactly as illustrated.

In ordering apparatus it is very important that full information be given

relative to your electrical current supply, shipping directions and the size or type of instrument that you desire. All our stock equipments are finished in quarter-sawed, golden tint oak and if no change as to finish or design is required we can usually make immediate delivery.

The reputation of "KELEKET" Roentgen Apparatus has been builded entirely upon merit and it is upon merit that we respectfully solicit your patronage. We give each purchaser full and complete value for his investment, this we guarantee, for we do not require any one to retain an article bought of us, if upon inspection he is not entirely satisfied with the same.

We exercise particular care in the packing of all shipments for which we make no charge, neither do we make a charge for drayage. The aggregate of these two items of expense for a year's business is enormous and we therefore require consignees to make claim upon transportation companies direct should any damage in transit occur. When unpacking, exercise due care in removing nails and screws so that the high finish of the goods may not be marred and disfigured. Check off each article and see to it that no small parts are left in the packing.

When describing apparatus please refer to plate numbers so as to insure accurate execution of orders. The privilege is reserved to deviate from details of designs as represented by illustrations whenever by desirable changes in construction the efficiency of an apparatus can be improved.

All the goods quoted in this catalogue are ordinarily kept in stock and can be forwarded within a reasonably short time after receipt of order. The latter will be acknowledged promptly and the probable date of shipment given.

Whenever instruments and apparatus have to be made specially to order and vary from our regular catalogue patterns a deposit equal to 25% of their approximate cost is to be paid in advance. Such special goods can not be returned for credit or exchange.

In the absence of specific instructions, goods will be despatched by the route that commends itself to our judgment as the most expeditious, secure and economical.

We are prepared to insure our goods against damage or breakage in transit at the following rates:

Seven per cent. of invoice value on all glass ware including X-Ray tubes.

Three per cent. of invoice value on all other apparatus.

Our terms are net cash. All accounts due and payable after 30 days from date of invoice; interest to be charged on accounts overdue.

A cash discount of 2% will be allowed on all bills paid within ten days from date of invoice.

It is desirable that names and addresses of customers should be distinctly written. Prospective purchasers will facilitate prompt execution of their orders by furnishing trade references as to their financial responsibility.

Export orders must be accompanied by remittance in full, or by satisfactory New York or London Trade references. Bankers' drafts, drawn at sight on New York or London Agents, or Post Office Orders, are the most advantageous methods of sending cash. On large foreign orders we are prepared to accept 25% of the value with the order and draw for balance through a banker against delivery of bill of lading.

Electrotypes.—To authors writing text-books, articles in periodicals etc., we cheerfully furnish our electrotypes without charge.

Plate No. 199.

This diagram shows that the object "O," when in correct position to be skiagraphed is not distorted, but considerably magnified, but when not in correct position it will be greatly distorted as is shown by the line "F L." Therefore, great inaccuracy will result from faulty positions and the use of very large plates.

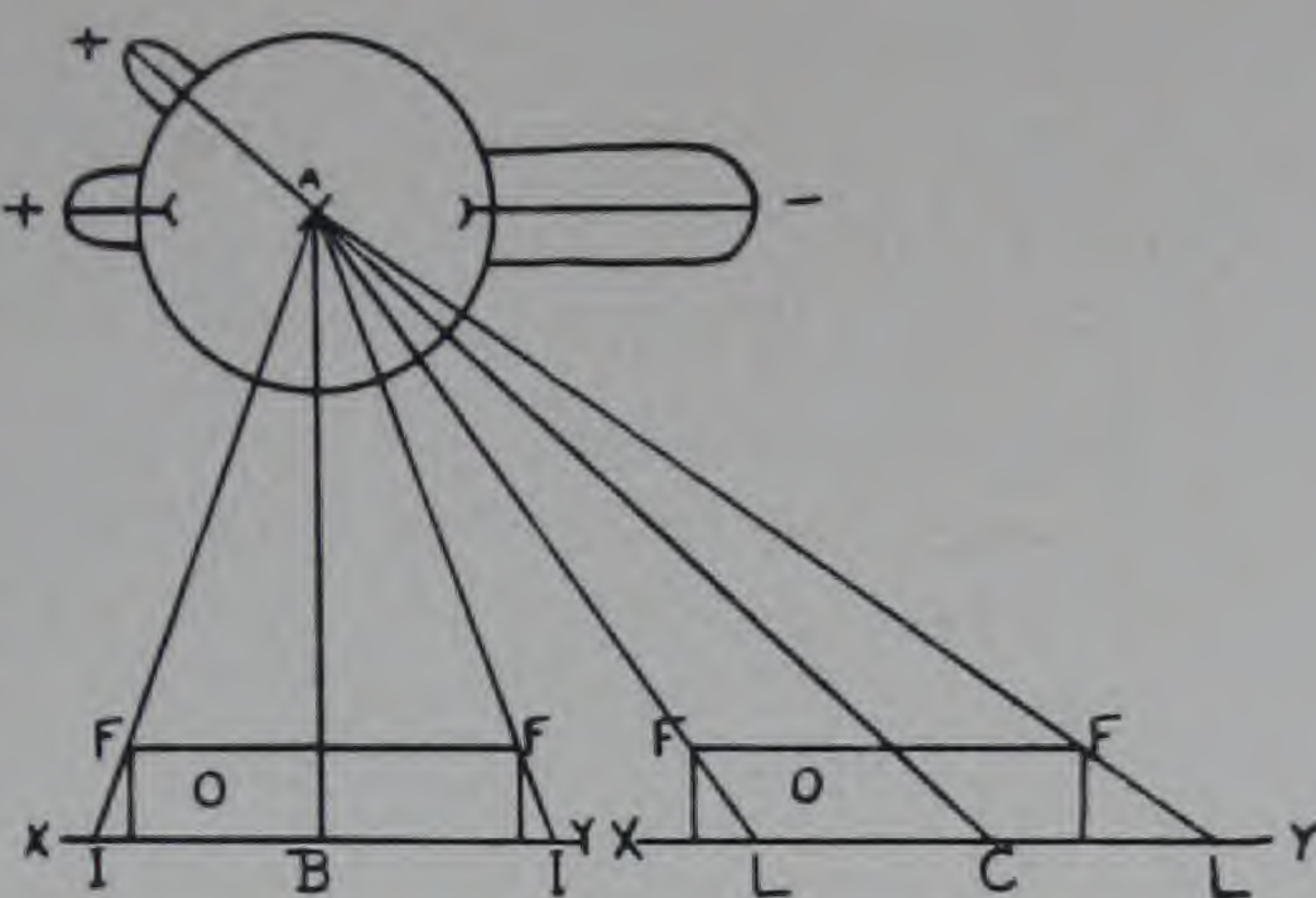


Plate No. 200.

This figure illustrates the great difference in the position and angle of a photographic plate to obtain a proper image from the various rays emanating from the target of an X-Ray tube.

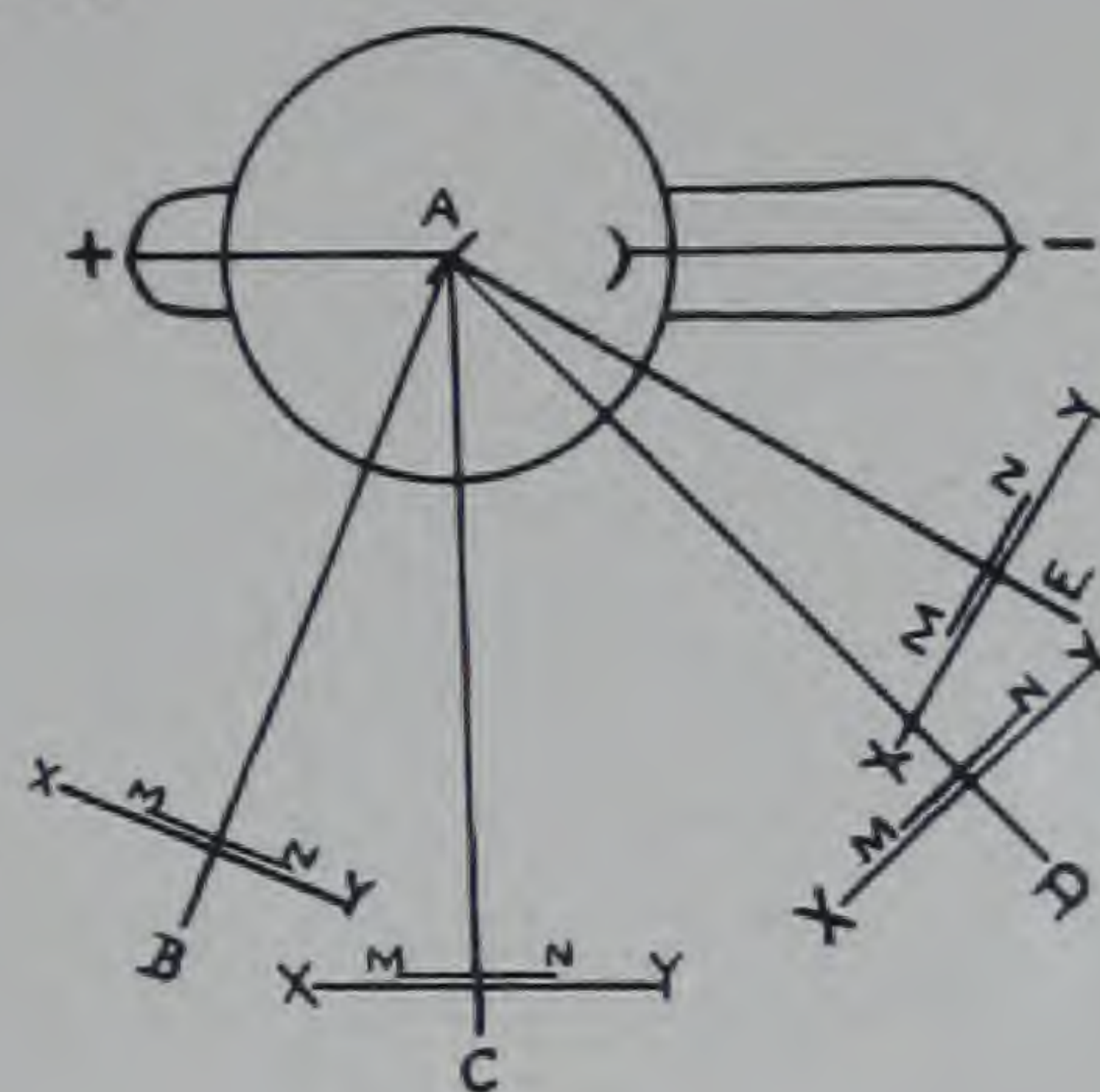


Plate No. 201.

The heavy line "F-F" in this diagram represents a sheet lead diaphragm, lines "G-G" the perpendicular or principal rays. The lines "M-M" are side rays which should be eliminated to prevent their fogging the photographic plate at "G-G."

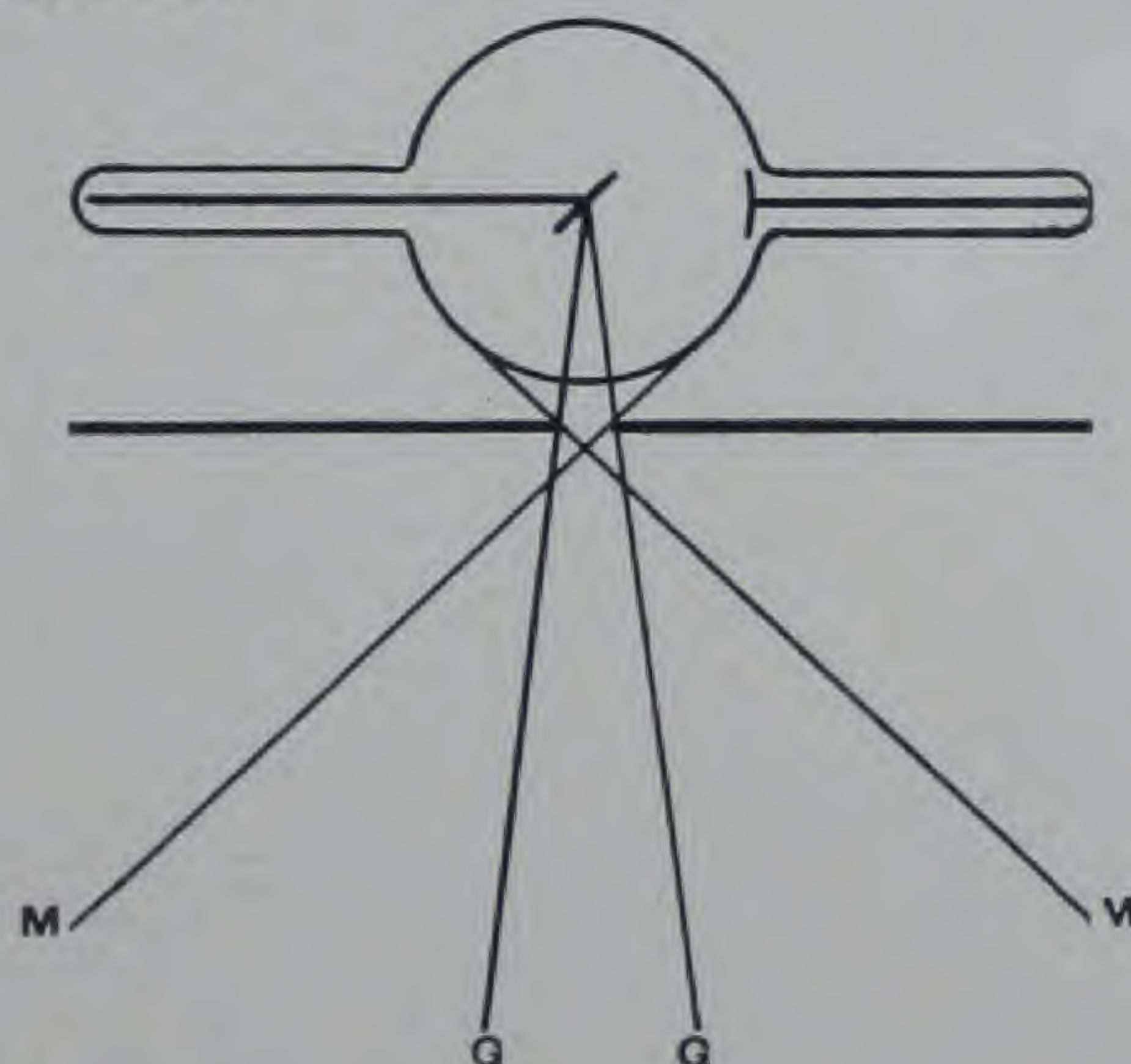


Plate No. 202.

This diagram shows the application of our corrugated lead-cones. The side rays "M-M" being absorbed and secondary radiation prevented by the grooved lead cylinder. Our centering rod enables the operator to direct the rays at an object as accurately as sighting a rifle.

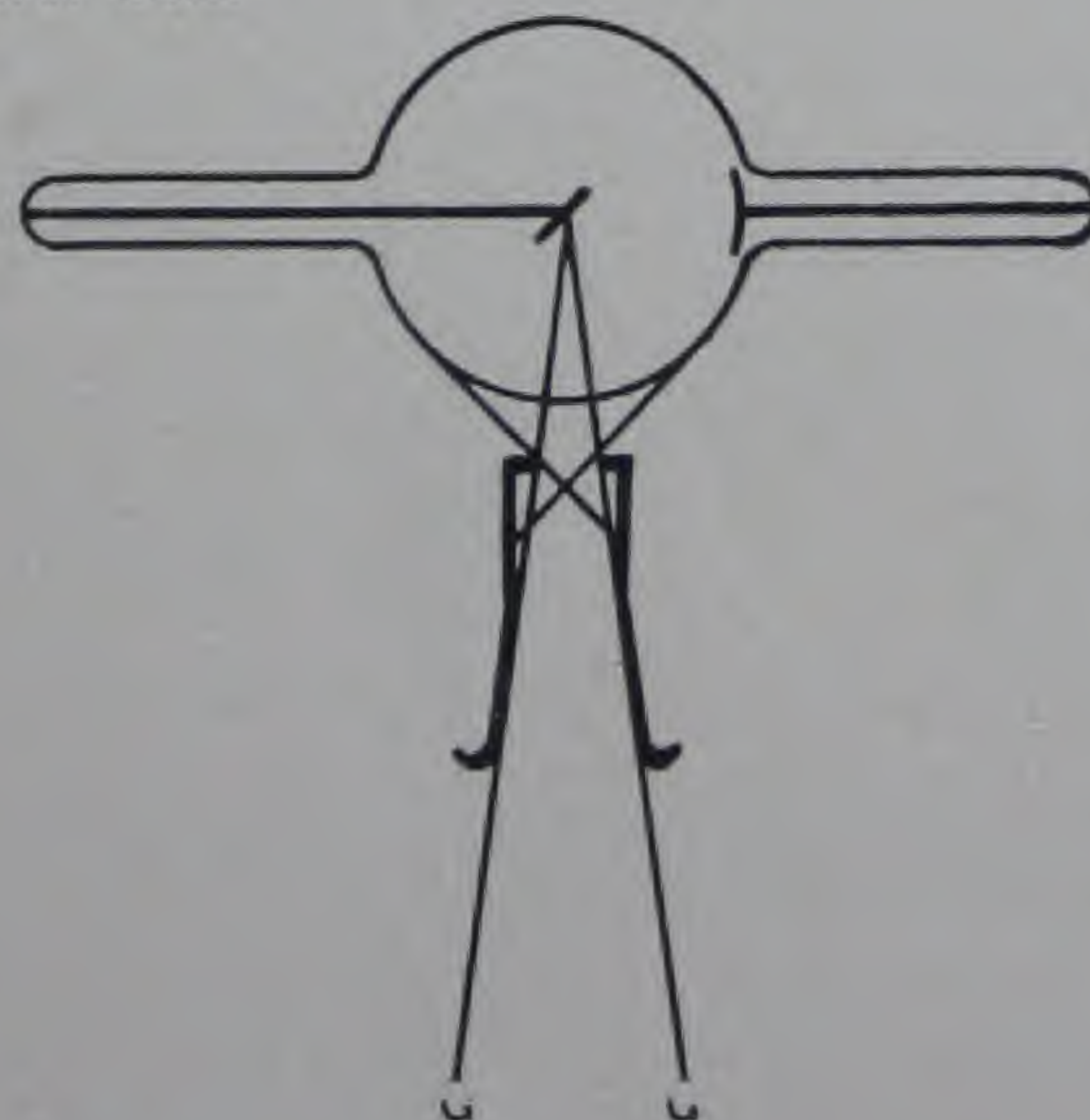
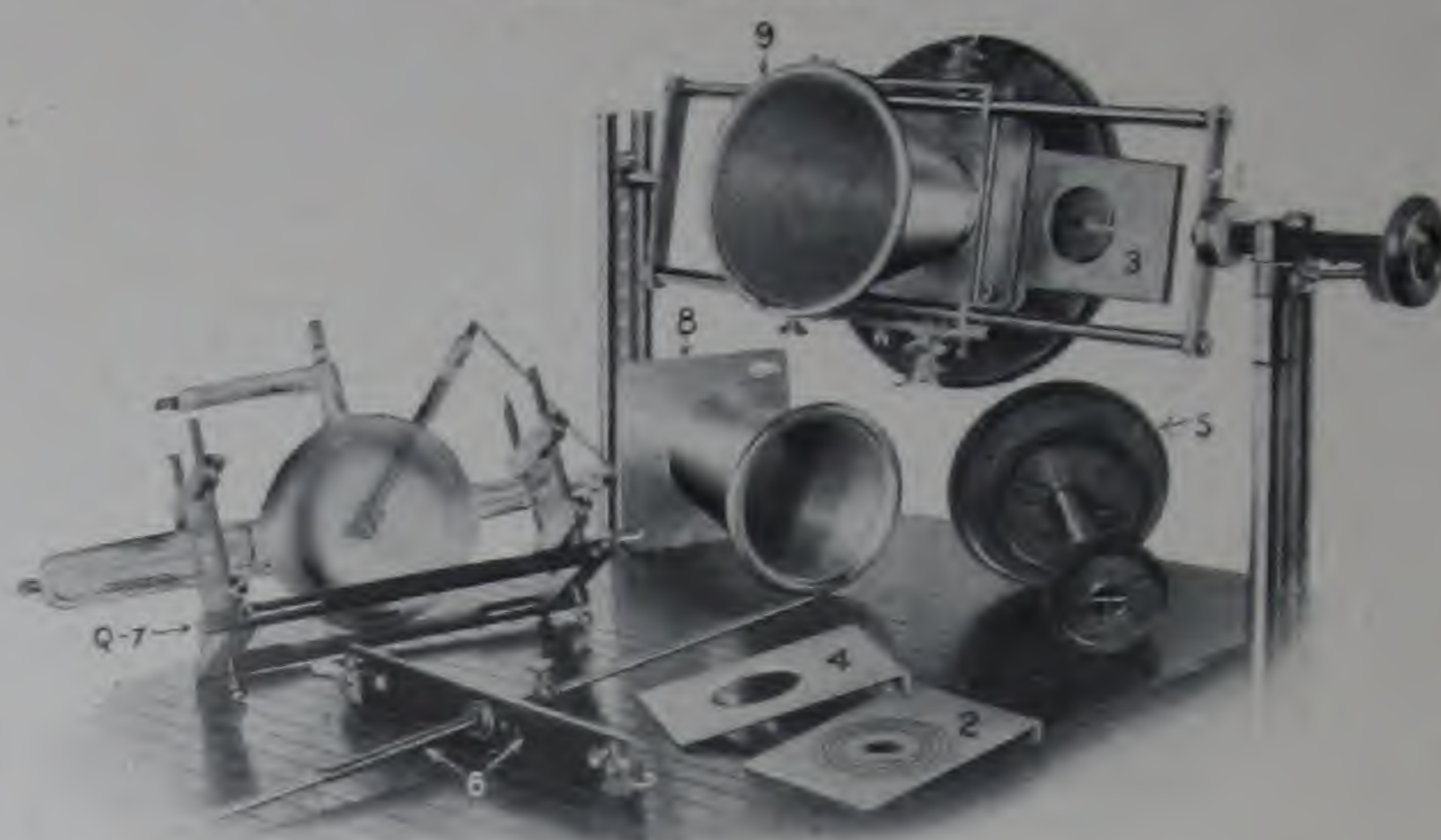


Plate No. 203.



Figs. 2, 3 and 4 are very heavy diaphragms, interchangeable as illustrated. Fig. Q-7 is an adjustable tube holder. Fig. 5 is a device for centering the tube over the diaphragm and cone. Fig. 6 is a centering rod for stereoscopic and other adjustments.

Plate No. 204.



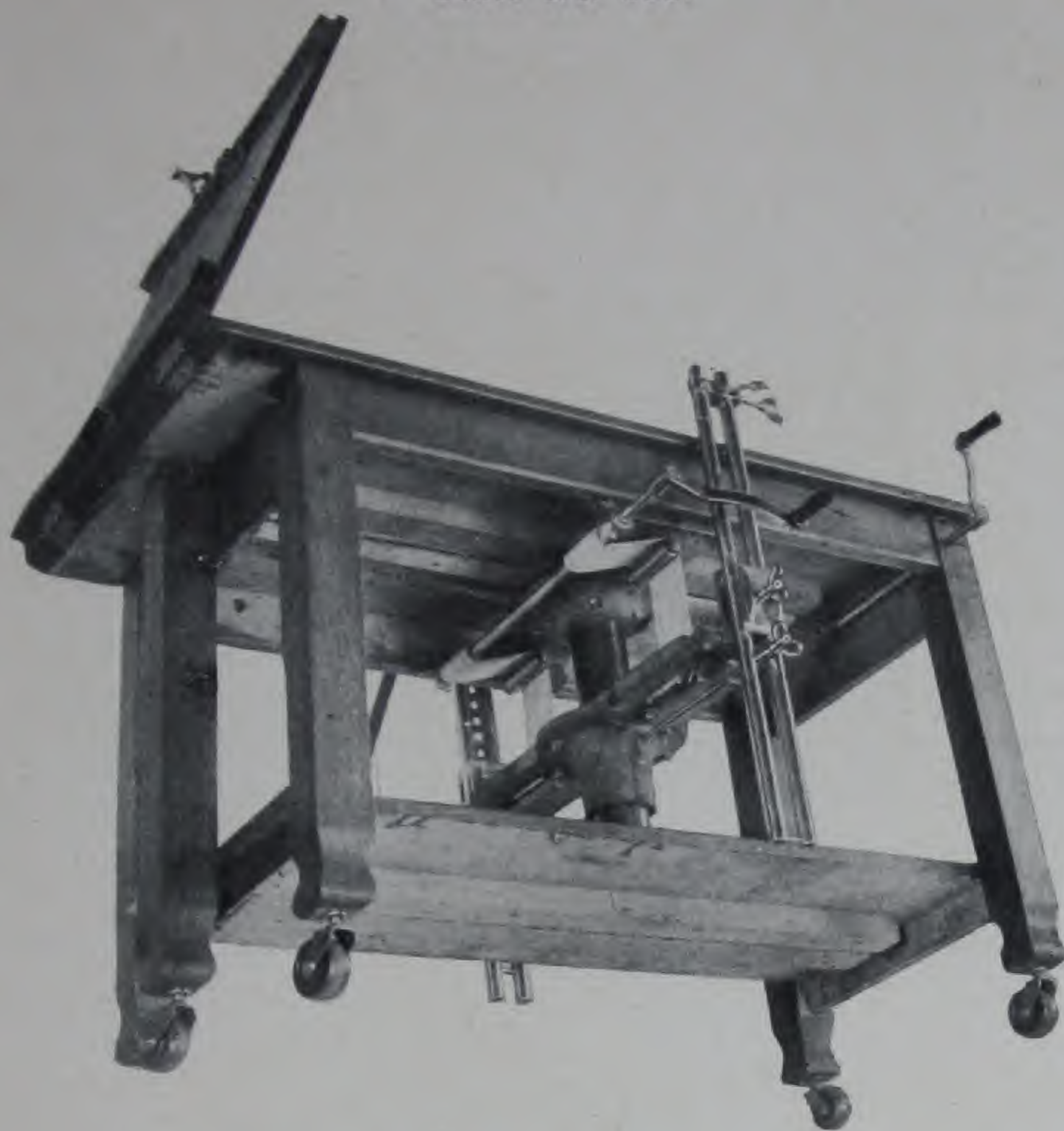
Horizontal tube carrier, adjustable to every conceivable position and so graduated that records can be made and any given formula duplicated at will. Indispensable in stereoscopic work.

Plate No. 205.



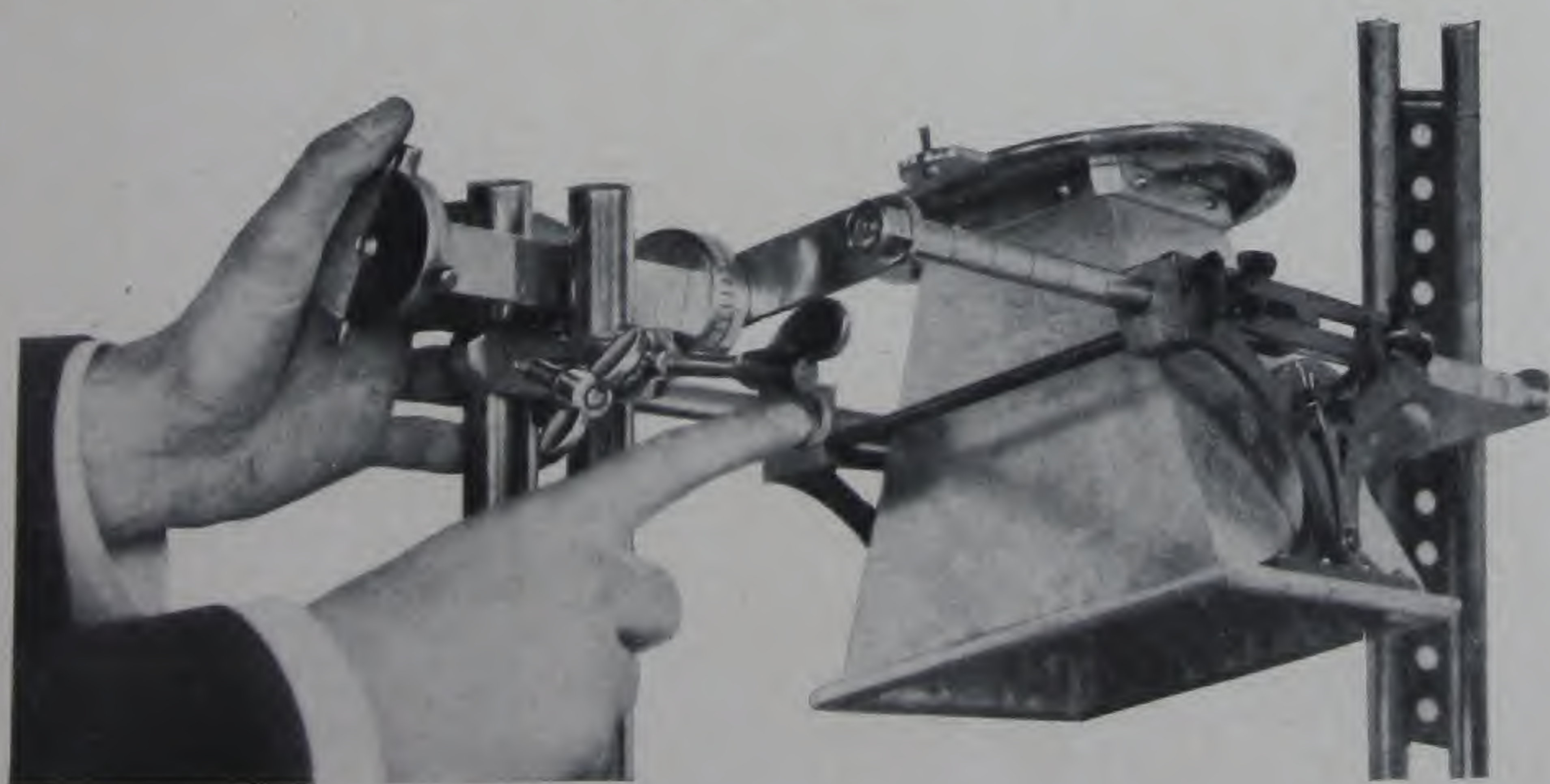
This tube Holding Saddle is interchangeable with all our compression diaphragm instruments and when ordered instead of the lead glass kettle type of shield the price of either the table or diaphragmed tube stand will be five dollars less. The side shields are imported (German) lead glass.

Plate No. 206.



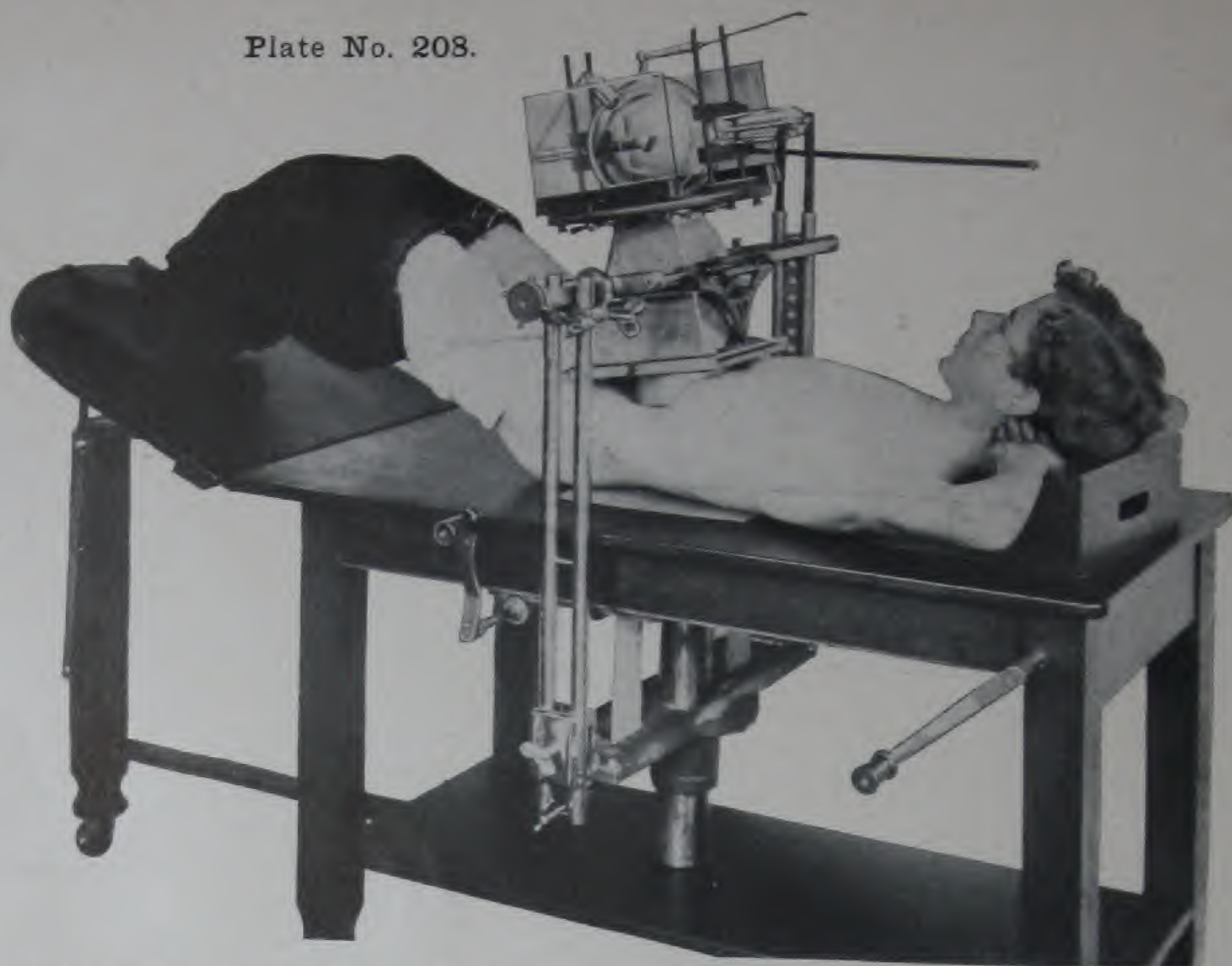
A lower view of types "E" and "F" Compression Diaphragm Tables, showing the raising and lowering crank mechanism. This movement is mechanically perfect; compare it in your own mind to the over-balanced side supports of tables of other makes.

Plate No. 207.



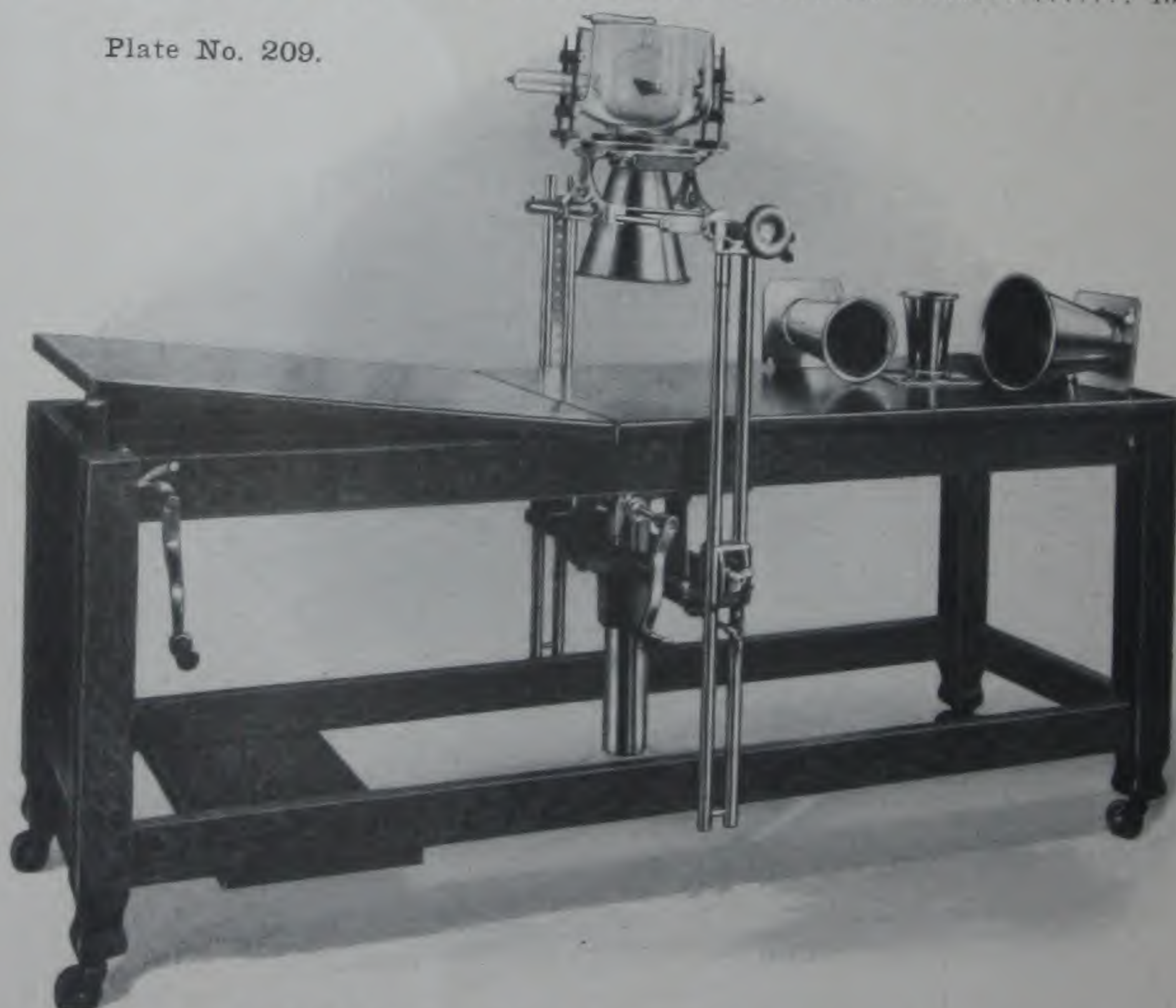
With the left hand push the horizontal frame forward, springing the upright standards apart slightly, then tighten this thumb-screw and the instrument will be rigid.

Plate No. 208.



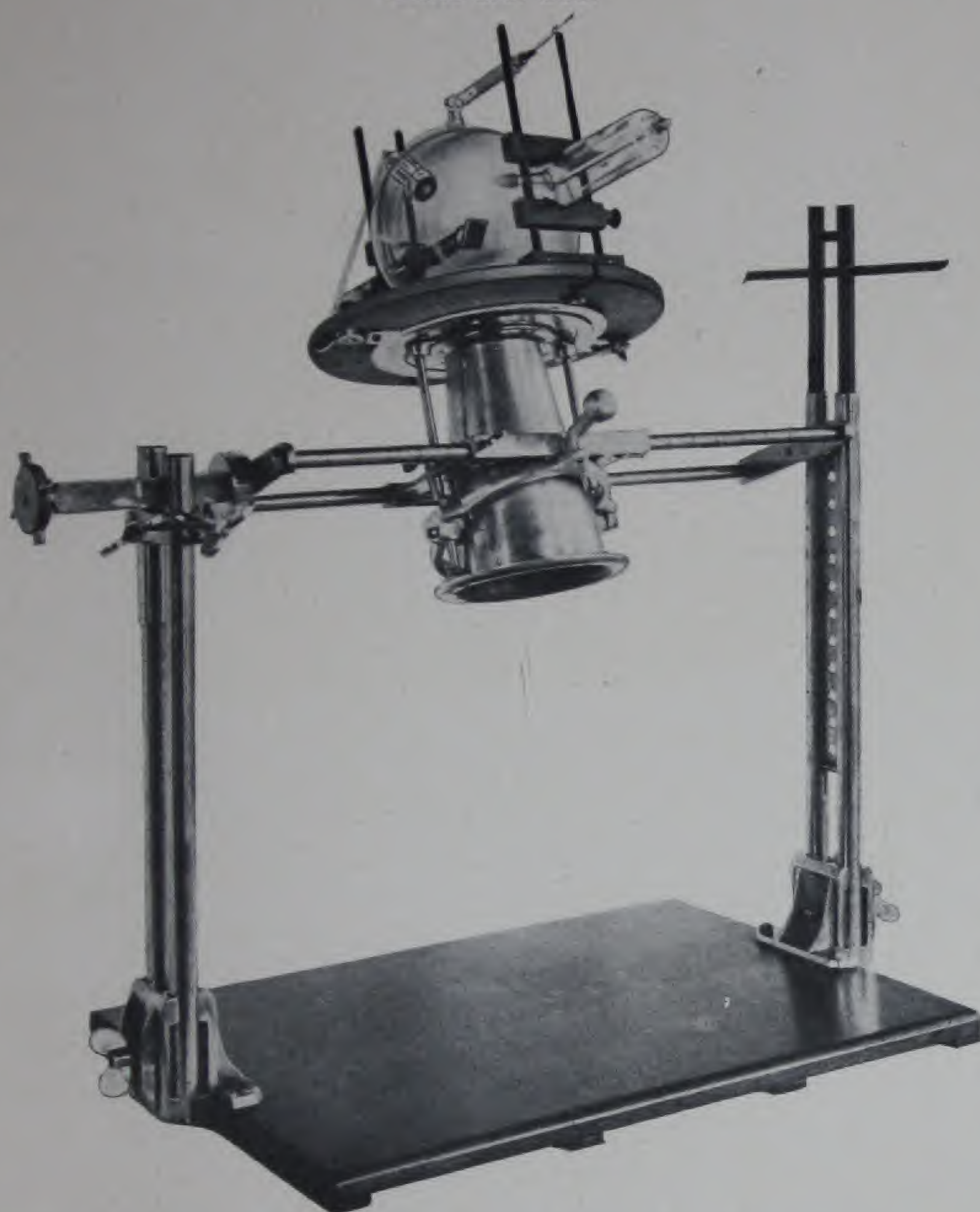
TYPE "E" COMPRESSION DIAPHRAGM TABLE (old half tone). This table will be fitted with exactly the same mechanism as our Type "F" table, and it differs from the latter in that its wing can be folded downward reducing its length to four feet to which its longitudinal crank adjustment is limited.
 Price, with lead glass plate shield.....\$130 00
 Price, with lead glass kettle shield..... 135 00

Plate No. 209.



TYPE "F" COMPRESSION DIAPHRAGM TABLE. This is our very latest model. its longitudinal diaphragm movement is full six feet. The plate holding attachment for making pictures in the upright posture can be added to it. This instrument constitutes a basic standard with which every localizing device and all accessory appliances of precision can be used.
 Price, with one cone and saddle as shown in Plate "205"\$130 00
 Price, with one cone and kettle shield as illustrated..... 135 00

Plate No. 210.



**TYPE "B"
COMPRESSION
DIAPHRAGM**

For use with any
table. Price as illus-
trated\$50 00

With lead glass pro-
tectors\$57 50

**TYPE "D"
COMPRESSION
DIAPHRAGM
TABLE**

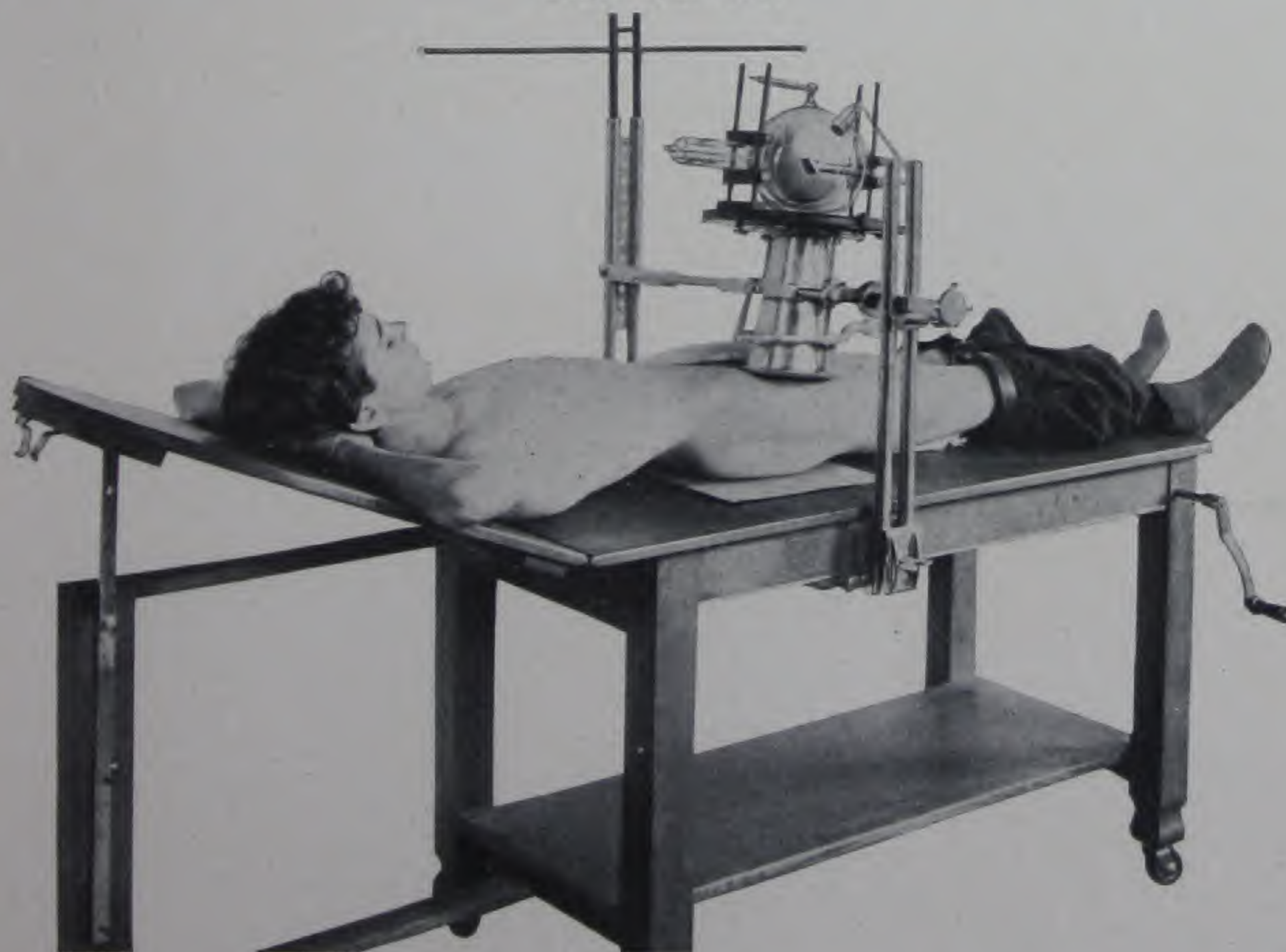
Freiberg design.

Price.....\$85 00

With lead glass pro-
tectors.....\$92 50

These instruments
are fitted with cone
for 8x10 plates, non-
inter-changeable.

Plate No. 211.



Apparatus and Technique

WE presume that you are familiar with our Grosse Flamme X-Ray Coil since we have published several well illustrated catalogues and much has been said about it in medical and surgical literature. Therefore, we shall confine these remarks to a description of a few accessory devices of precision, the use of which are of equal importance with the Roentgen Ray itself.

You may already possess an X-Ray Coil and if you do, you will be interested in our Diaphragm Table, Localizers, etc. If you have no Roentgen equipment you should either consider the purchase of one, or you should enlighten yourself regarding modern appliances and their value as a diagnostic medium that you may be in a position to better estimate the value of the work being done for you by your local Roentgenologists; therefore we ask you to kindly read the following pages in their entirety.

The prevalent erroneous idea entertained by physicians in general that X-Ray work is merely a mechanical procedure, applied at random without any very clear conclusion as to whether its application is for diagnostic or therapeutic purpose, must now give way because it is no longer tenable. Sleepless study, tireless experimentation with an expenditure of health, wealth, and a sacrifice of human lives have been the contributing elements with which the real Roentgen diagnostician has added to his accomplishments until his laboratory with its rulings is the court of last resort.

It has not been so very long since individual physicians and some large hospitals spoke and wrote boastingly of their complete X-Ray laboratories, when an inventory of the same would reveal one little Generator, either a Static Machine or Coil, a few cheap Tubes and a Fluoroscope. Today an operator who cares for his reputation would not try to get along with such an outfit, since to do so would bring disrepute not only to himself but the science of Roentgenology as well.

A good Coil and Tube is but the commencement of an outfit, while a Fluoroscope is merely a plaything for which the well trained operator has but little use. We would not have you misconstrue our meaning, we do not want you to understand that we advise the purchase of a car load of apparatus, indeed you might not know how to use so many devices if you had them.

The beginner's initial outfit be it either for individual or hospital use, should consist of a good Coil and Tube complete, a Patient's Table combined

with adjustable Tube Holder having a means of confining and directing the rays, a good general Localizer and means for developing the photographic plates; other special devices for special purposes can be added from time to time as occasion may require. For information relative to our Coil and its

parts we refer you to our regular catalogues, while the accompanying illustrations and descriptive matter will acquaint you with our Patient's Table, centering and localizing devices.

We have made our type "F" Compression Table as presented herewith a basic standard with which all of the appliances necessary for diagnostic purposes can be used. We trust that you will take the pains to study these illustrations very carefully. You will observe that we have spared neither time nor expense in our desire to present this piece of mechanism in as comprehensible a manner as the cut maker's art will admit, our object being not so much our desire to make sales, but rather to instruct the operator in the proper handling of the apparatus in his daily work.

It may be of interest to some to know that our type "F" Radiographic Table was not invented in a day, that its beautiful lines, its compact form and ingenious assemblage of parts was not the immediate result of a few strokes of a pen wielded by the masterful hand of some wise, clever designer.

Way back in 1901 previous to the arrival of Dr. Albers Schoenberg's

book in this country, the idea of such a table was suggested to us by Dr. Freiberg of Cincinnati and we immediately set to work upon such an instrument. Our first models were of much value, the principle was right but it requires experience to work out a correct plan for such a universal appliance. Our earlier efforts were but stepping stones in the evolution of a final accomplishment.

As to the importance of the use of a Compression Diaphragm Table in Roentgen diag-

Plate No. 212.

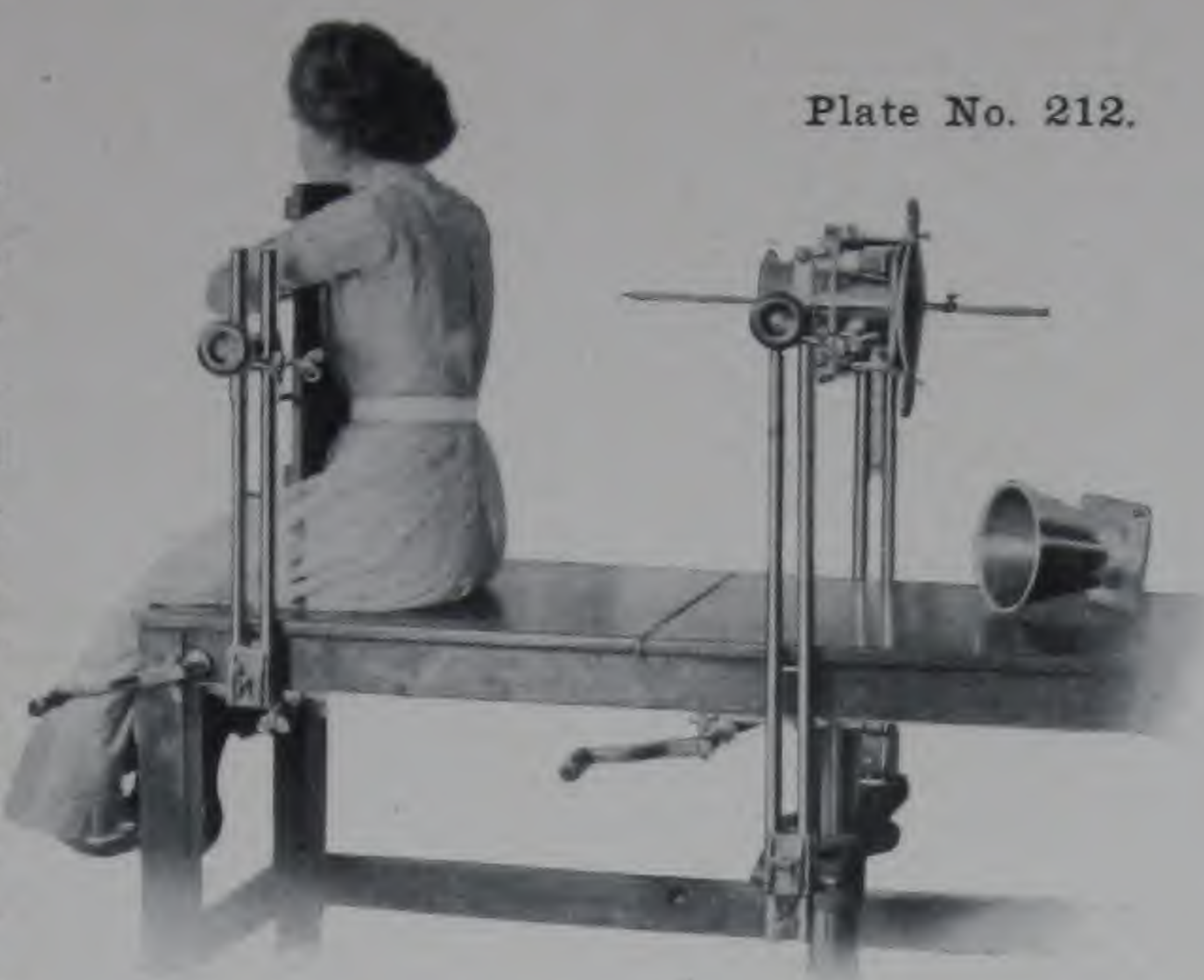


Plate No. 213.



nostic work there is surely no room for argument; a photographer had just as well attempt to produce good portraits without lenses in his camera or a sportsman go to target practice with a smooth-bore, sightless rifle as for a doctor to attempt to do diagnostic X-Ray work without a means for accurately directing the Rays. In fact the latter is of far greater importance, as the health and life of human beings are at stake.

Should there be any question in the minds of prospective purchasers as to the relative value of our type "F" Diaphragm Table as compared with tables made by other firms either in this country or abroad, we would respectfully call the attention of such to the following facts:

1st.—Unlike most manufacturers who claim to make "*Everything Electrical*," we design and manufacture only X-Ray apparatus — *The Grosse Flamme Coil and accessory appliances*.

2nd.—Our type "F" Diaphragm Table is the final result of nine years of experimentation, during which time we have built many hundreds of Compression Diaphragm Tables.

3rd.—We have had advantage of the solicited and friendly criticism of hundreds of X-Ray operators who are using our former types of tables in their every day Roentgen work. For *very valuable* suggestions we are particularly indebted to such well known Roentgenologists as Willey, Lange, Carman, Freiberg, Hickey, Dachtler, Bowen, Hulst, Skinner, Webb, Holding, Cole and many others.

4th.—We maintain a testing laboratory in our factory where actual experimental tests are almost constantly being made to prove the practicability of our product; here, each and every suggested improvement that we deem worthy of consideration is carefully tested out in actual practice.

5th.—A member of our firm makes frequent visits to the laboratories of many of the most expert Roentgen operators in the large cities to study their requirements both in their hospital and private laboratory work and it is by such careful attention to detail that we can sincerely and honestly recommend our product as being superior in every respect.

The matter of *material* and *workmanship* are two very important factors that we desire to lay especial stress upon. It may be that other manufacturers can obtain as good material and can employ as skilled workmen as can we, but the question is, *are they doing it?*

Plate No. 214.



For several years past we have had *this* field all to ourselves; we were a long time selecting metals that would not rust, tarnish and become unmanageable, woods that would not shrink, swell, warp and crack. We are past the experimental stage, we have reached the goal; others must learn by sad experience and great expense which will be borne by those who buy their product.

Briefly outlined the specifications for our type "F" Compression Diaphragm Table are as follows:

DIMENSIONS.—Length 72 inches; width 24 inches; height 30 inches.

MATERIAL.—Solid quarter sawed American oak; best Sherardized iron; yellow heavily nicked brass; 98 per cent pure drawn aluminum. Corrugated welded lead; cold drawn seamless steel tubing; hard rubber, etc.

SHIPPING WEIGHT.—Approximately 400 pounds for Compression Table complete.

DESIGN.—A flat massive rigid Patient's Table mounted on strong casters, fitted with removable top wing as shown in Plate No. 209 or a folding non-detachable wing as shown in Plate No. 208 (type "E"), chain and sprocket longitudinal crank adjustment and windlass vertical movement as shown in Plate No. 206.

DIAPHRAGM MECHANISM.—A horizontal metal frame as shown in Plates Nos. 203, 204 and 207 upon which slides a double A-shaped tube carriage having a 12-inch lateral movement, a complete circle rotary adjustment, with a side inclination of 22 degrees on both sides of the vertical. The tube and saddle can be revolved a complete horizontal circle thereby enabling the operator to reverse the tube without detaching it.

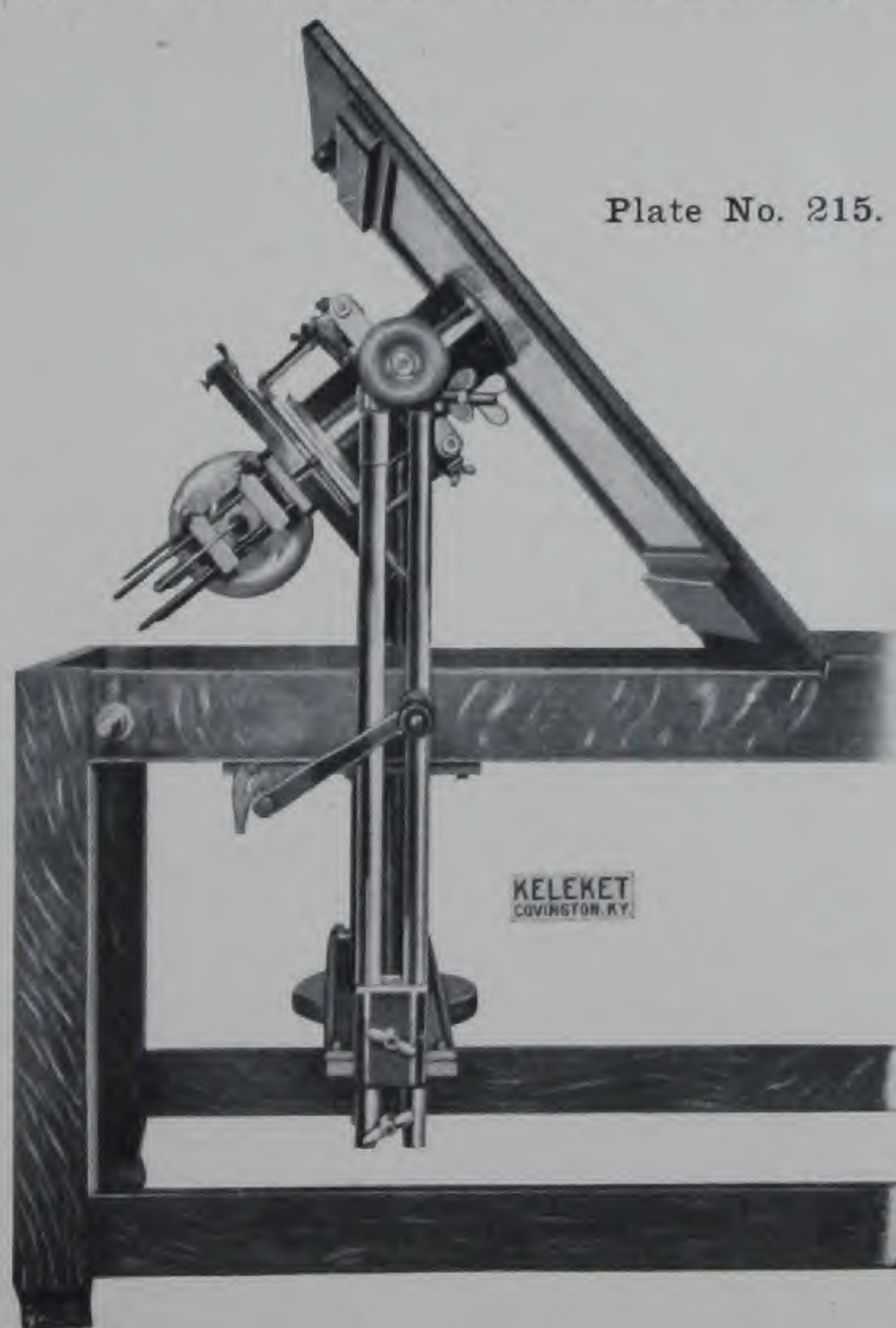
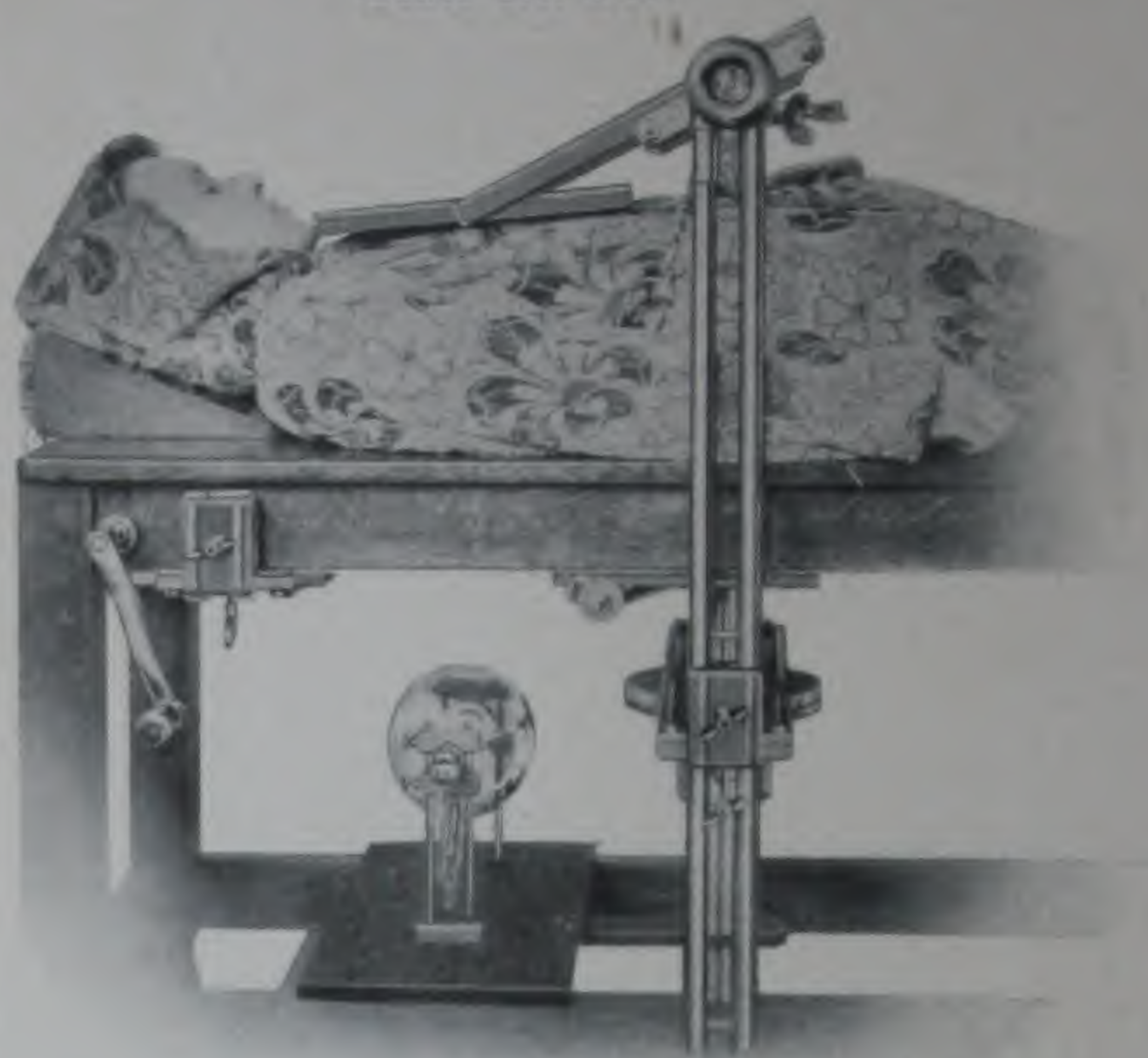


Plate No. 215.

CONES AND DIAPHRAGMS.—Any size or shape of diaphragm or compression cylinder (cone) can be used with these Tables; we are now making cones in the following sizes of lower apertures: 3½-inch for frontal sinus pictures, eye localization and all small picture work; 5¼-inch for single kidney pictures and all exposures requiring an 8x10 photographic plate—this cone is especially suited for making hip pictures of adult subjects; 7¼-inch cone designed with special reference to double kidney work, and for making

pictures of both hips of children at one exposure. We also make a $7\frac{1}{4}$ -inch square pyramidal shaped compressor as shown in plate No. 207; all cones and diaphragms are instantly removable and interchangeable without the necessity of removing a screw or a nut.

Plate No. 216.



CORRUGATED CONES.—

While it has been proven that the X-Rays cannot be reflected or refracted, it is nevertheless true that a secondary radiation is set up by their coming in contact with dense substances, which amounts to practically the same as being reflected or deflected, therefore to intercept this secondary radiation which emanates from the interior of a smooth lead

lined compression cylinder, we have invented a method by which we corrugate the entire interior surface of all our compression cones, which is a very valuable feature and is one of the *many* contributing elements enabling operators to produce such vivid, clean and perfect pictures. We have often heard it said that X-Ray pictures made with the K. K. Compression Diaphragm are more like steel engravings than mere "shadowgraphs."

VERTICAL ADJUSTMENT.—To be of practical value the upper works of a Compression Diaphragm Table must necessarily be quite heavy, otherwise it cannot be stable, rigid and entirely opaque. To find a simple, effective and durable means for raising and lowering such a weighty apparatus and one of such unusual design, has proven itself to be a most difficult task; but that we have finally succeeded perfectly we believe is quite clearly proven by an inspection of the apparatus or a reference to our several illustrations, especially Plate No. 206.

DOUBLE SUPPORT ESSENTIAL.—It should be borne in mind that rigidity is a paramount necessity in a Compression Diaphragm and that any construction wherein the cone diaphragm and tube are supported at one point only (but one side of the Table) is defective, because rigidity cannot be attained and retained by such a method; the patient's breathing will cause the cone and tube to vibrate and ruin the exposure. In addition to the above mentioned defect the screw adjustments of the existing one-sided top heavy types of Tables are too slow and their range of adjustment are too limited. Such postures as are shown in the accompanying illustrations cannot possibly be accomplished with them.

Plate No. 217.

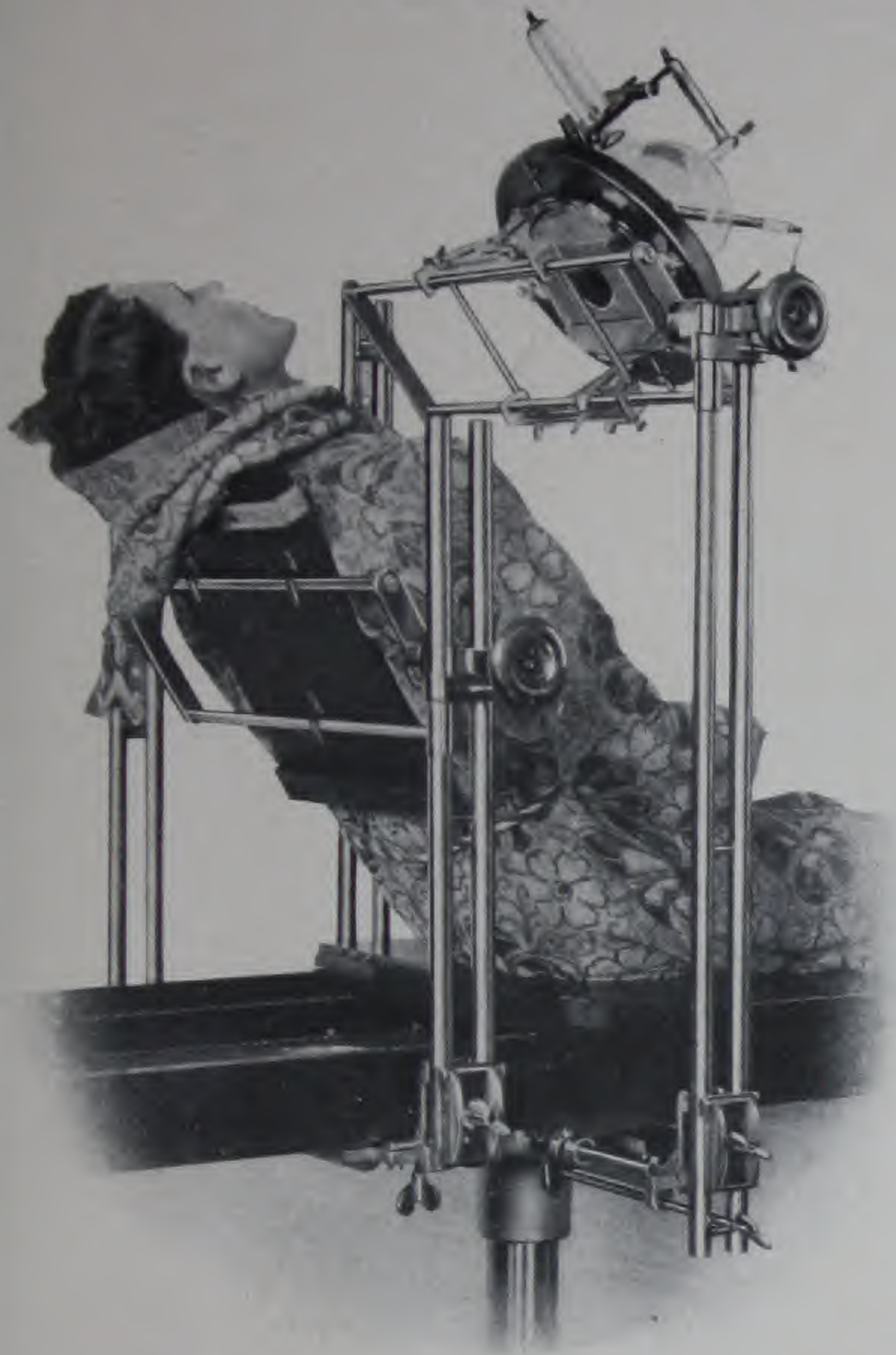


Plate No. 218.

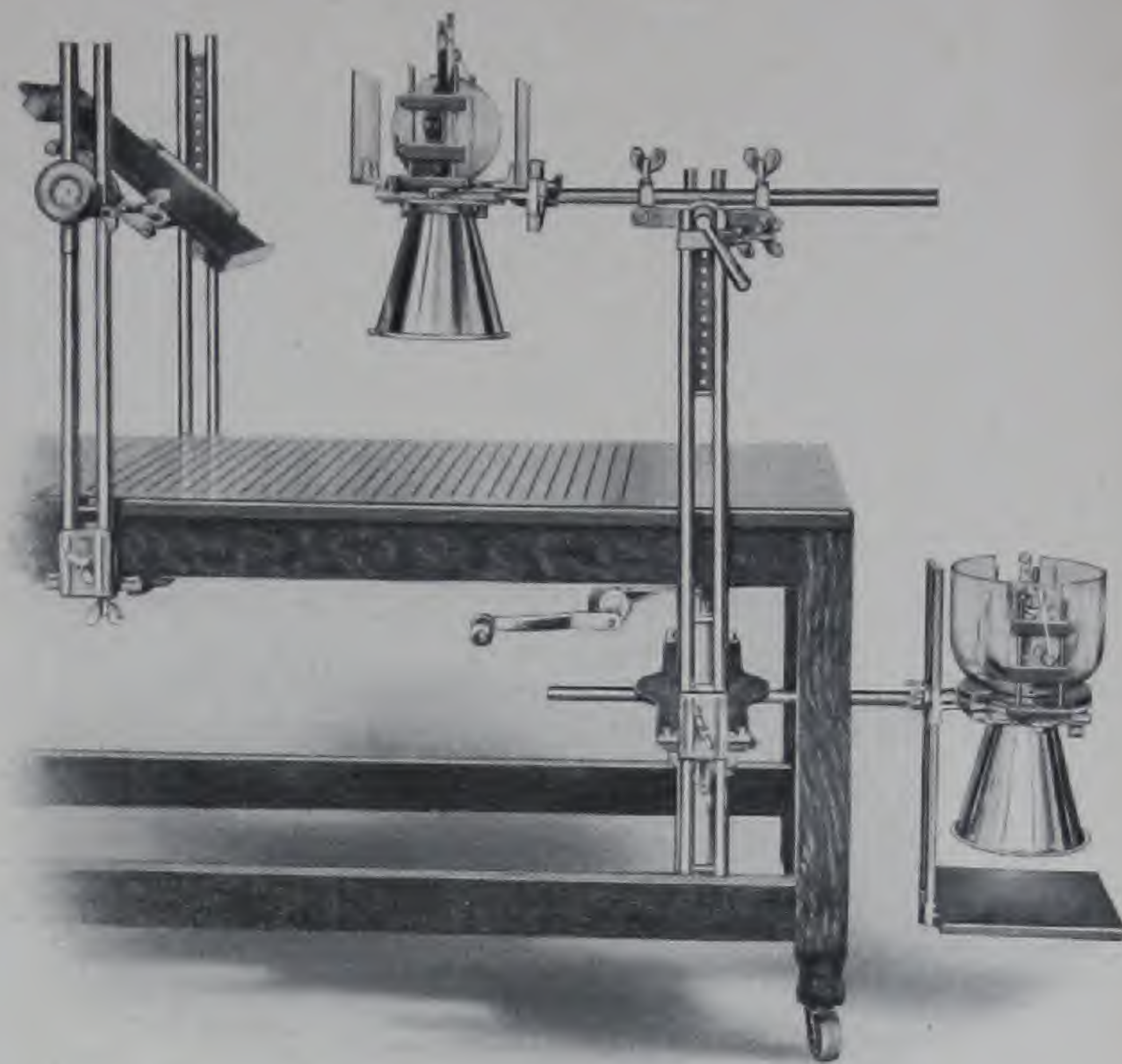


Plate No. 220.

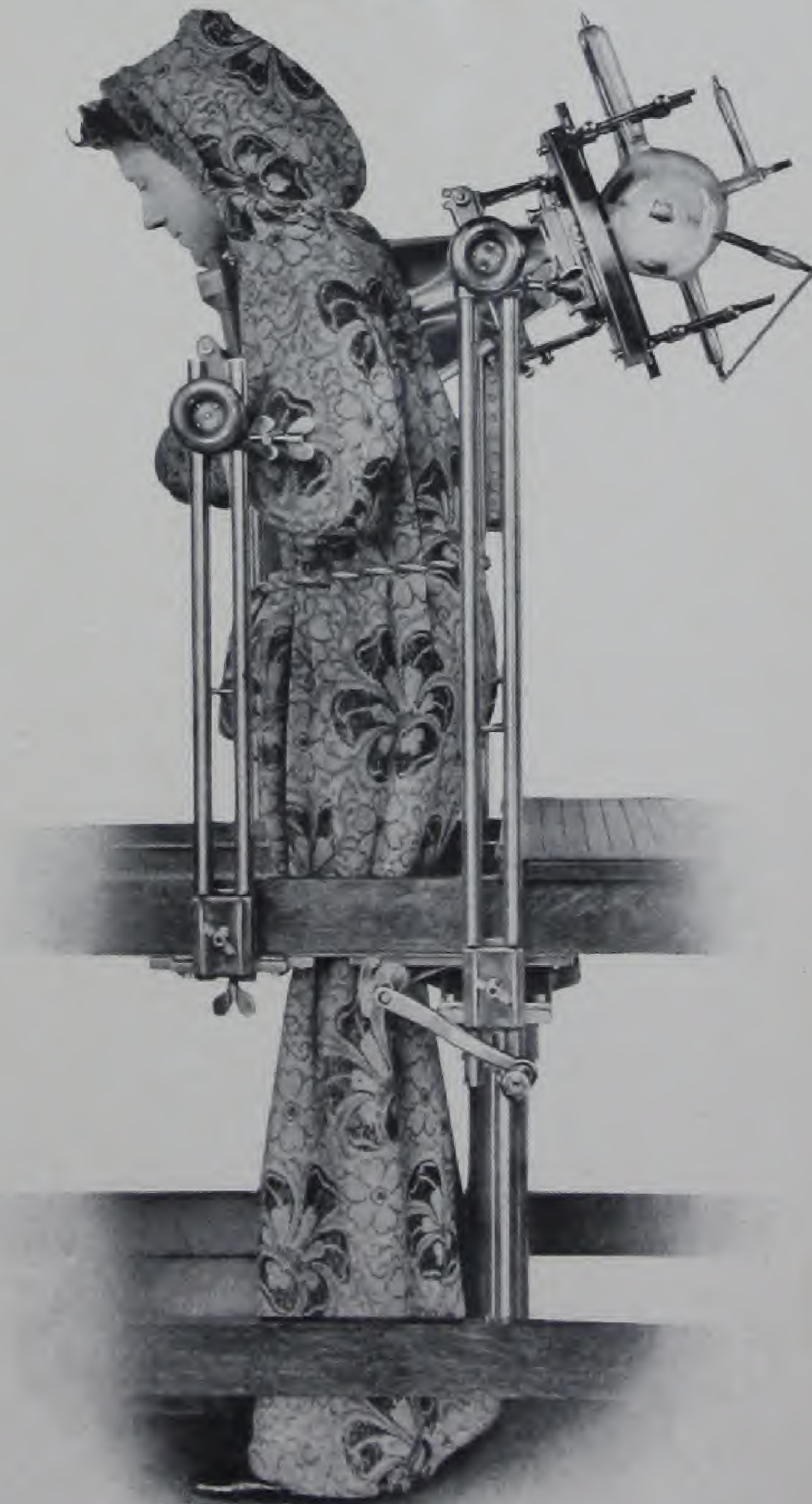


Plate No 219.

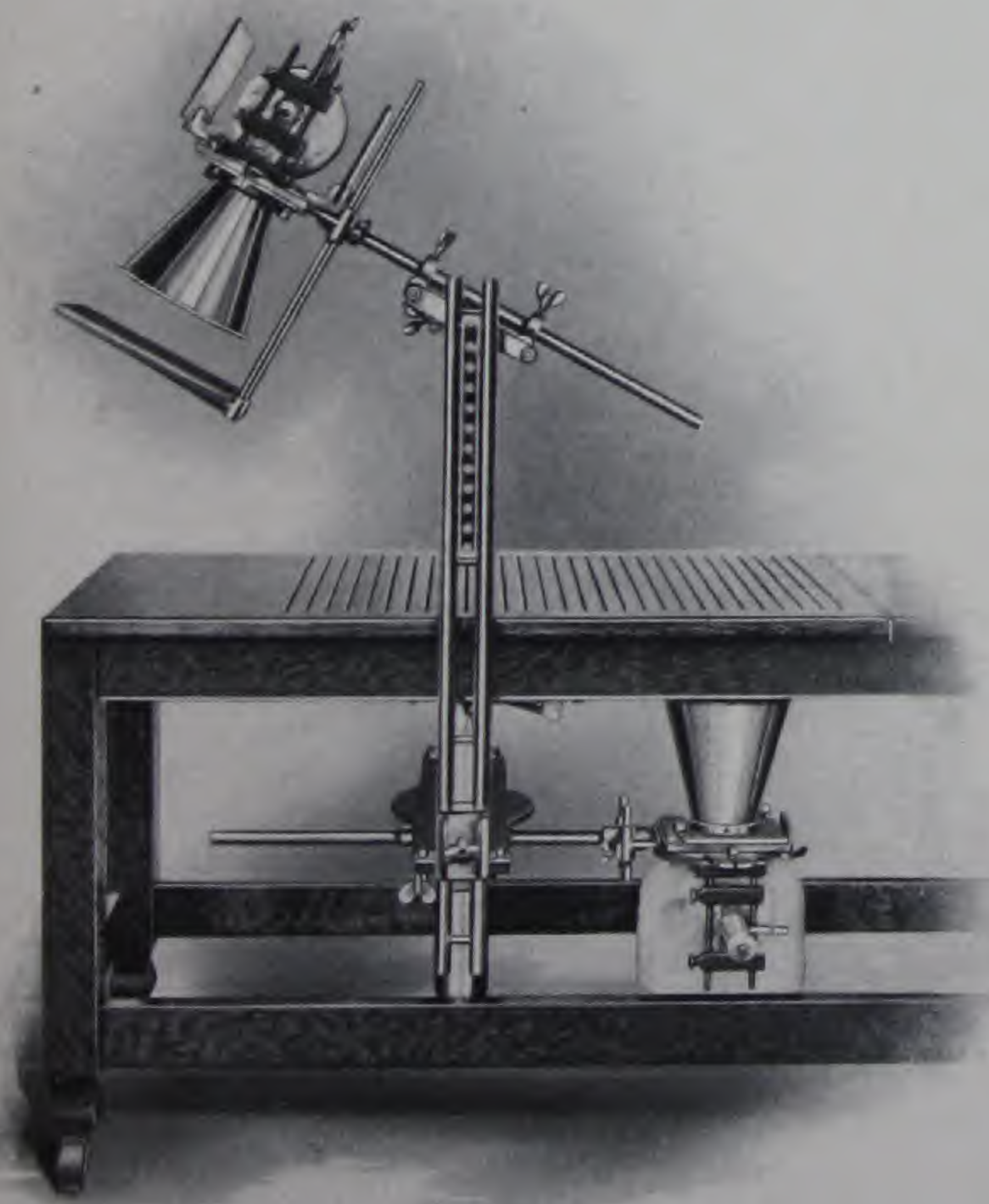
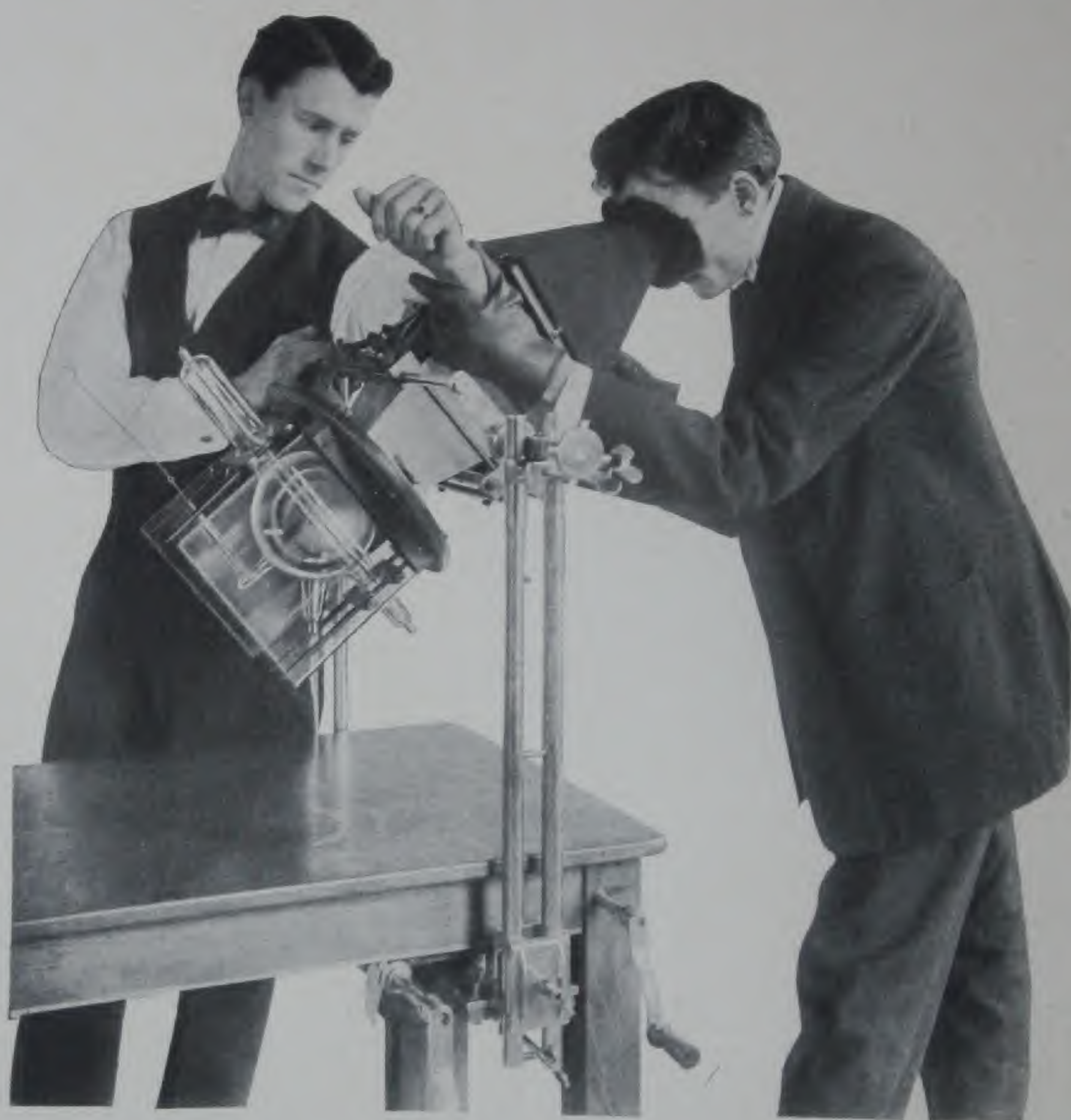


Plate No. 221.



NO MONKEY WRENCH.—Our type "F" Table can be assembled and dis-assembled without the use of tools, all parts are held securely in position by means of clamps and hand screws of our own design and make. To properly appreciate the tremendous amount of thought, experimentation and participation in actual Roentgen work that has made this invention possible, one must not only see the completed apparatus, but he must use it in actual practice. The beauties of its possibilities will unfold to you as you advance

with your work; every known adjustment can be made with it and when you have studied out some original and difficult technique for doing something new, you will be surprised to find that your K. K. Compression Table is perfectly adapted for that very thing and you will ask yourself: "Did Keleket do it first?"

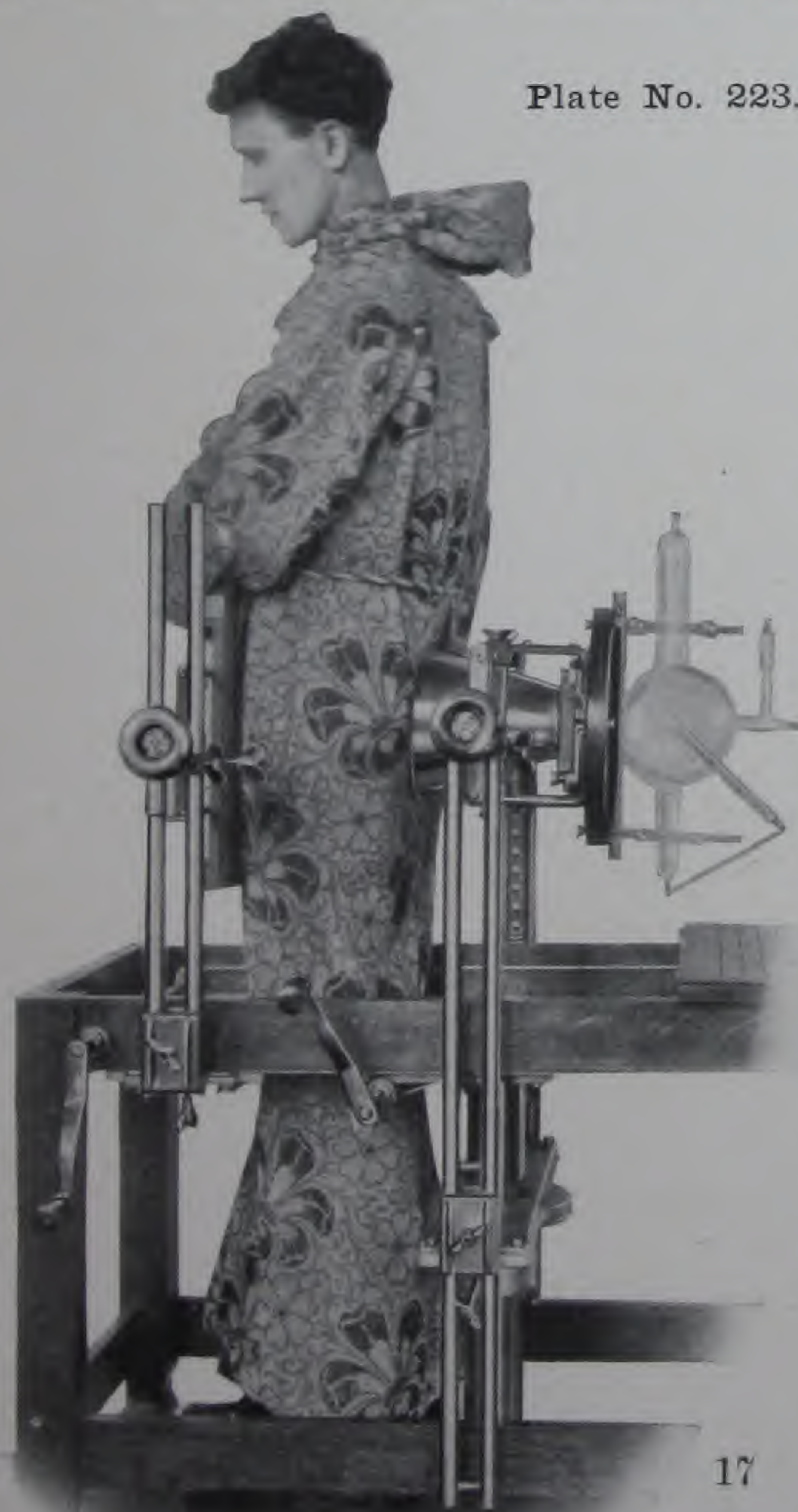
THEY ARE ALL TOGETHER.—Those of our readers who have done work with other makes of "X-Ray Tables" know quite well how very annoying it

is to have to be continually passing to *the other side of the Table* to make an adjustment, thereby coming in contact with the high tension wires. With the

Plate No. 222.



Plate No. 223.



on the operator's side of the apparatus and the entire superstructure is made solid and rigid by turning two thumb screws, the one at index finger in plate "207" and the one marked "Z" in plate 222.

To properly assemble a K-K Table first use your own judgment (a good X-Ray operator thinks for himself,) then refer to these illustrations for confirmation. Be careful that the upright standards are as illustrated, the one with vertical holes near its top must go to the (back) side opposite the cranks, otherwise all hand screws will not be on one side of the table.

Have your assistant clean the metal parts occasionally.

STEREOSCOPIC ROENTGENOGRAPHY

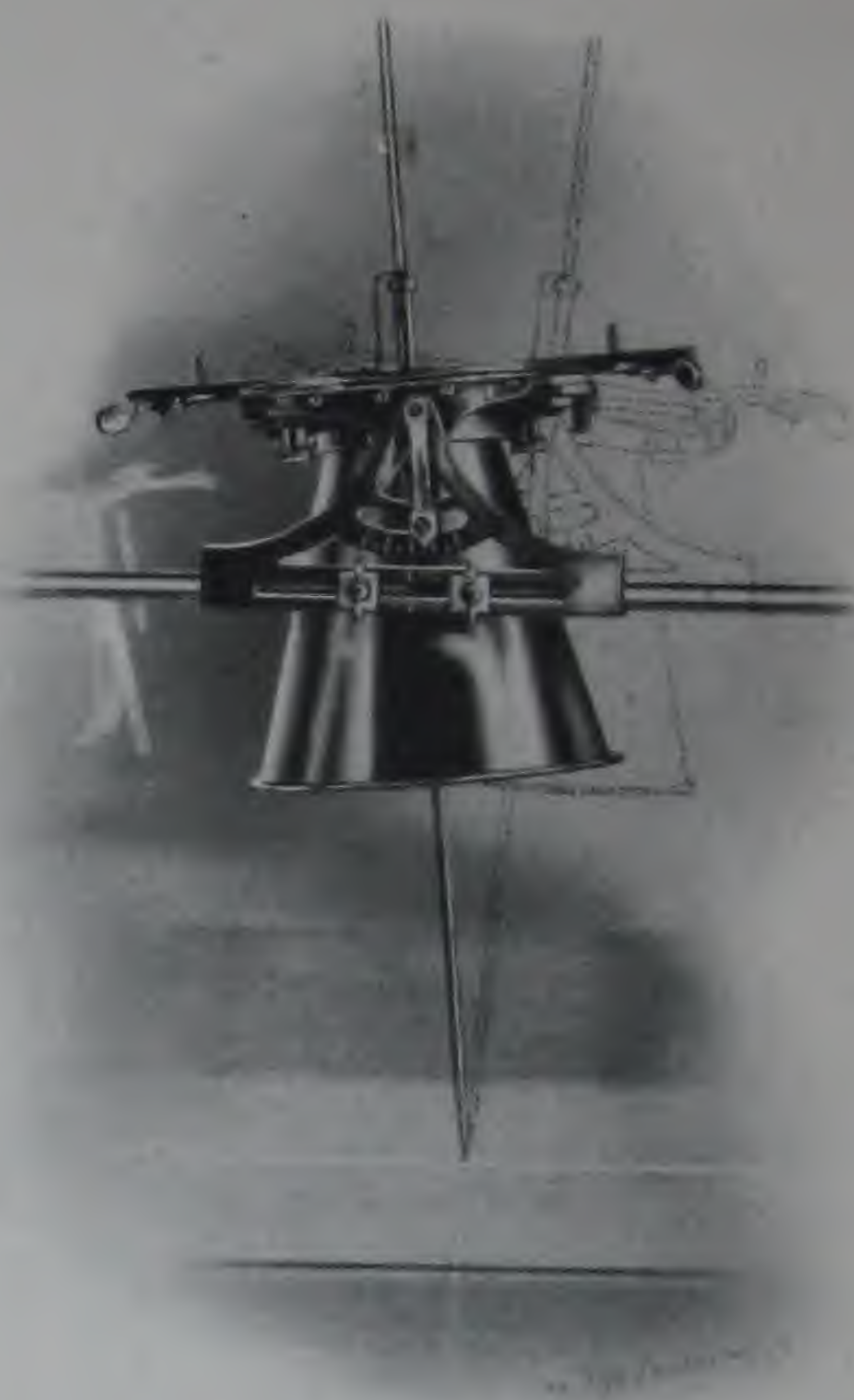
Without dwelling upon the merits of Stereoscopic Roentgenography as a diagnostic method with its wide applicability in the field of localization, we will briefly call attention to the wonderful adaptability of our Radiographic Table for this class of work.

Heretofore operators have experienced considerable difficulty in properly adjusting their Tube so as to make the two stereoscopic exposures correctly even in the simplest perpendicular work; while the more difficult cases such as stereoscopy of the chest and stomach with the patient standing, sitting or recumbent has required so much time for adjustments that but few have cared to attempt it.

The wonderful flexibility of our Diaphragm Table and the accuracy of its adjustments has so simplified Roentgen stereoscopic technique that pictures can be made stereoscopically in *any* position quite as easily and quickly as to make them in any other way. In fact, so perfectly has the mechanical features of our diaphragm apparatus been worked out that it is now a very easy matter to quickly direct the rays at an object the size of a bird-shot and to photograph that object at right angles to a plane horizontal to the perpendicular or at any angle or combination of angles to the same and to so set the instrument that a change of adjustment for the second stereoscopic exposure can be made accurately within a fraction of a second and it need not require more than two minutes to make the necessary preliminary adjustments.

Another most important feature is that the moving parts are all tabulated in degree marks so that by recording the readings of the dials in a given case the same adjustments can be duplicated at will, thereby enabling operators to accurately reproduce results and to record formulas for various operations. With this instrument, Dr. Sidney Lange is enabled to obtain most uniform results in the double inclination of the axis of the rays in his stereoscopic oblique postero-lateral views of the mastoid region and his published formula and *modus operandi* will be readily understood and appreciated by operators who are so fortunate as to possess our Type "F" Diaphragm Table.

The making of Roentgenograms stereoscopically with our Type "F" Diaphragm Table is a most easy and simple procedure. You have only to bear in mind that you are to make two pictures of an object, one for each



of your eyes and that the position of the focal point of the Tube must correspond with the center of the cornea of your eyes for each exposure, presuming your eyes to be the same distance from the photographic plate as is the focal point of the X-Ray tube.

Referring to the accompanying illustration, plate No. 224, should one's face be placed exactly above the center of the photographic plate so as to look downward upon the same, a perpendicular line drawn from the bridge of the nose midway between the eyes would touch the plate at its center, while a line drawn from either eye to the same center point on the plate would represent the source and course of the X-Rays for each stereoscopic exposure at the same distance, exactly as is represented by the rod and its dotted counterpart in the illustration.

The centering rod of this very ingenious apparatus is the *magic wand* that simplifies the entire procedure. It represents the center of pupillary distance, enabling you to *hinge* the X-Ray camera at the plane of the surface of the plate, while stop lugs (on the opposite side of the cone) representing the average pupillary distance, restrict the horizontal movement so that when the Cone is pushed to either side as far as it will go and the stop lugs set as shown in cut, the Cone will tilt and the rod will point to the center of the plate for each adjustment as illustrated.

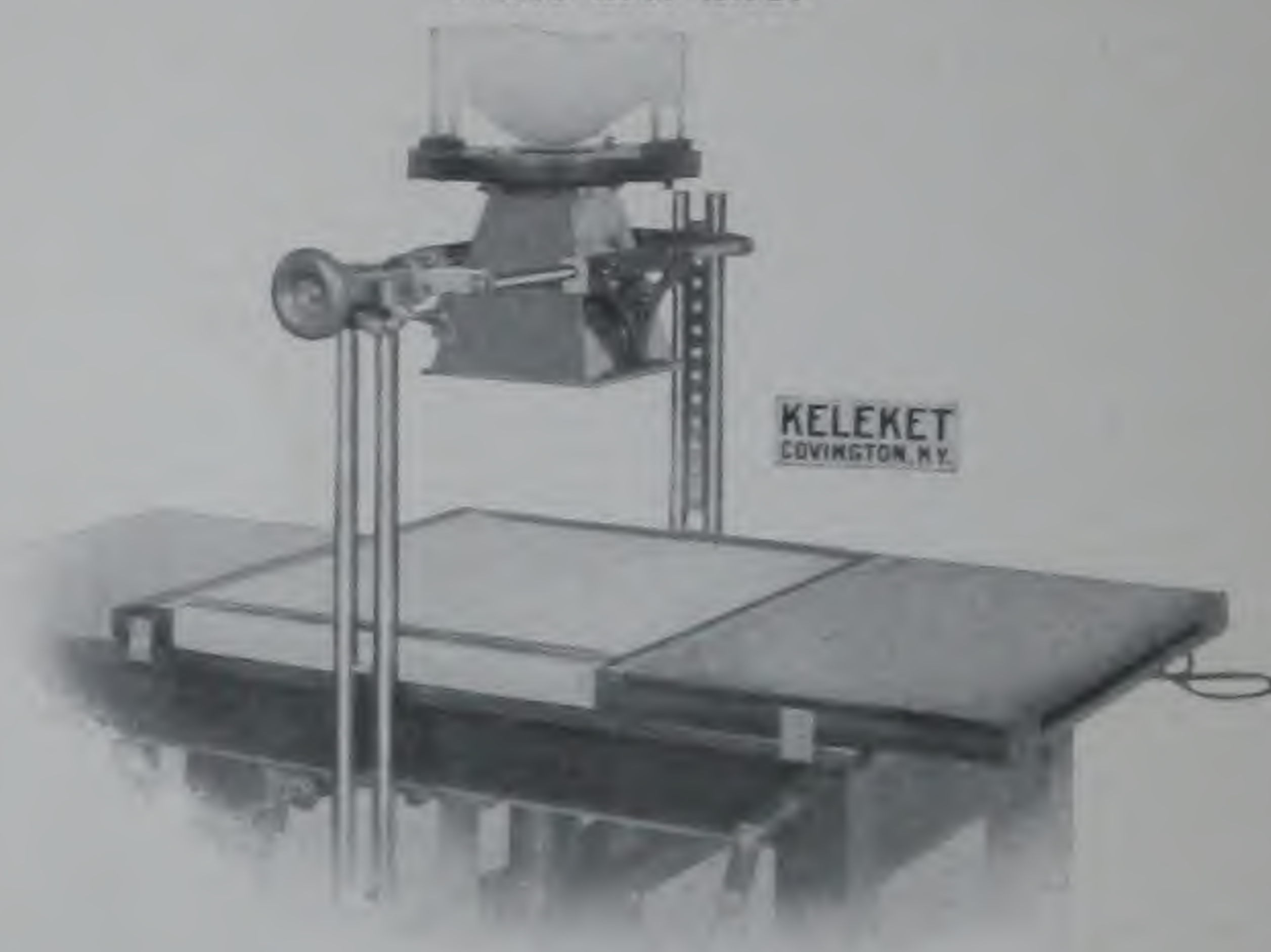
We desire to impress upon the minds of users of our appliances the great importance of stereoscopic Roentgenography. We would discourage the use of very large plates because of the great distortion and superimposing of parts; one small Stereoscopic view made with the light accurately centered upon the pathological part at such an angle as to avoid superimposing overlining tissue or bones that might cause conflicting shadows is more valuable by far than *many* large "catch-as-catch-can" plates hap-hazardly made as is the case when operators try to show everything on a single plate.

PLATE HOLDING SLIDE AND TUNNEL SUPPORT FOR SHIFT- ING THE PLATES IN STEREOSCOPIC WORK

To construct an instrument to satisfactorily suspend the body of a heavy adult on a table so as to exchange up to and including 14-inch by 17-inch photographic plates from beneath his hips and have them placed very close to the latter for each exposure has proven to be one of the most difficult tasks of our experience. But that we have succeeded most perfectly is exemplified by the accompanying illustrations, some of which are reproductions from our patent drawings.

Plate No. 225 shows our Stereoscopic Tunnel complete and in position on the table. This instrument consists of a strong metal frame, having a wooden tunnel support at one end and a taut-drawn, thin aluminum cover at the other, through which the X-Ray exposures are made. On the bottom side of this instrument are thumb screws for convenience in retightening the sheet aluminum should it at any time sag.

Plate No. 225.



Price \$20.00

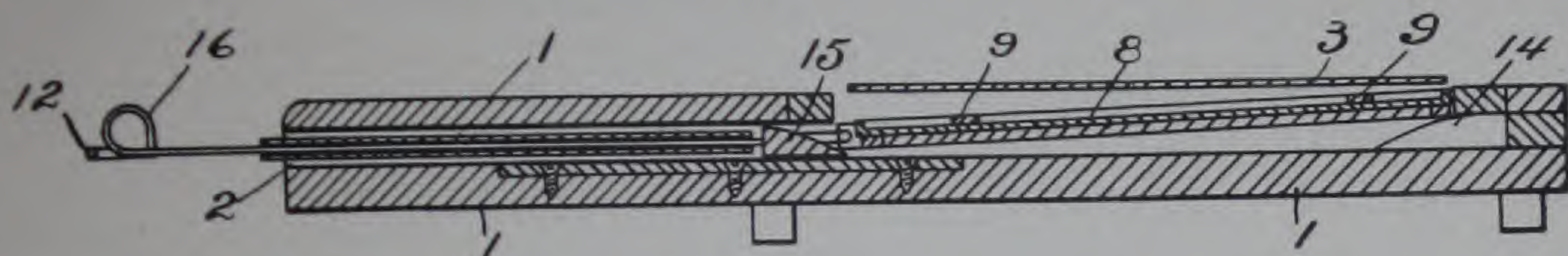
The wooden addition to this aluminum tunnel acts as a support to that portion of the patient not being photographed so as to enable the operator to manipulate the photographic plates from the end of the table. For example, when it is desired to photograph any part of the body from the hips upwards, the subject is placed upon the table with the head to the wooden part of the tunnel. But should it be desired to make pictures of any portion of the limbs below the hips the subject must lie in the reverse position.

We have learned by experience that to get the best possible results in X-Ray photography we must place the photographic plate as close as possible to the subject to be photographed and it is for that reason that we have designed a method for elevating the plate so that its surface will be in actual contact with the taut-drawn aluminum support, but so placed that the patient's weight cannot spring and break it. This we have surely accomplished, because you do not elevate the plate until the subject has been placed in position.

Sketches Nos. 226 and 227 are reproductions from our patent drawings which show our method for elevating the plate better than we can express it in words.

As already stated, this sliding plate holder and tunnel is made to accommodate all sizes of plates up to and including 14-inch by 17-inch, and with it operators are supposed to make each of the two stereoscopic exposures on separate plates. The mode of procedure is as follows: Place the tunnel in position on the table as shown in Plate No. 225. If it is desired to use 14-inch

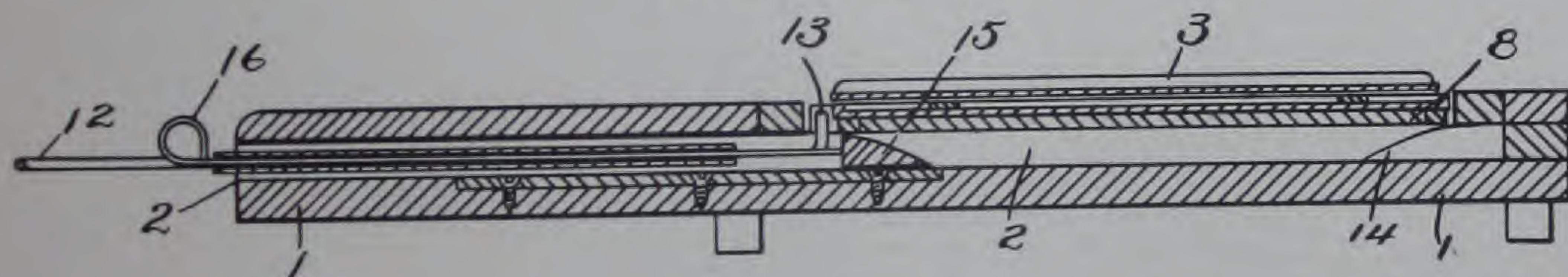
Plate No. 226.



by 17-inch plates, the same will exactly fill the plate holder, whether placed with its greater diameter lengthwise or across the table and therefore the center of the same will exactly coincide with the center of the aluminum support as indicated by cross lines drawn upon its upper surface. The tube carriage of the table is then brought in correct vertical alignment by means of the centering rod indicator as heretofore mentioned and as more fully described in our specific directions.

Should it be desired to use photographic plates smaller than 14x17 inches, as, for instance, 8x10-inch plates, which are best for views of the hip of an adult, the two metal strips supplied should be placed in position by means of the anchor-pins, as provided for plates of that dimension, this will serve to hold the plate in correct lateral alignment with the center of the tunnel and the plate can be pushed as far as it will go, either to the right or left side, depending upon whether it is the right or left hip to be photographed. Therefore, the center of the 8x10 plate will be on the line of the lateral center of the tunnel and four inches from its margin if placed lengthwise, or five inches if crosswise the table.

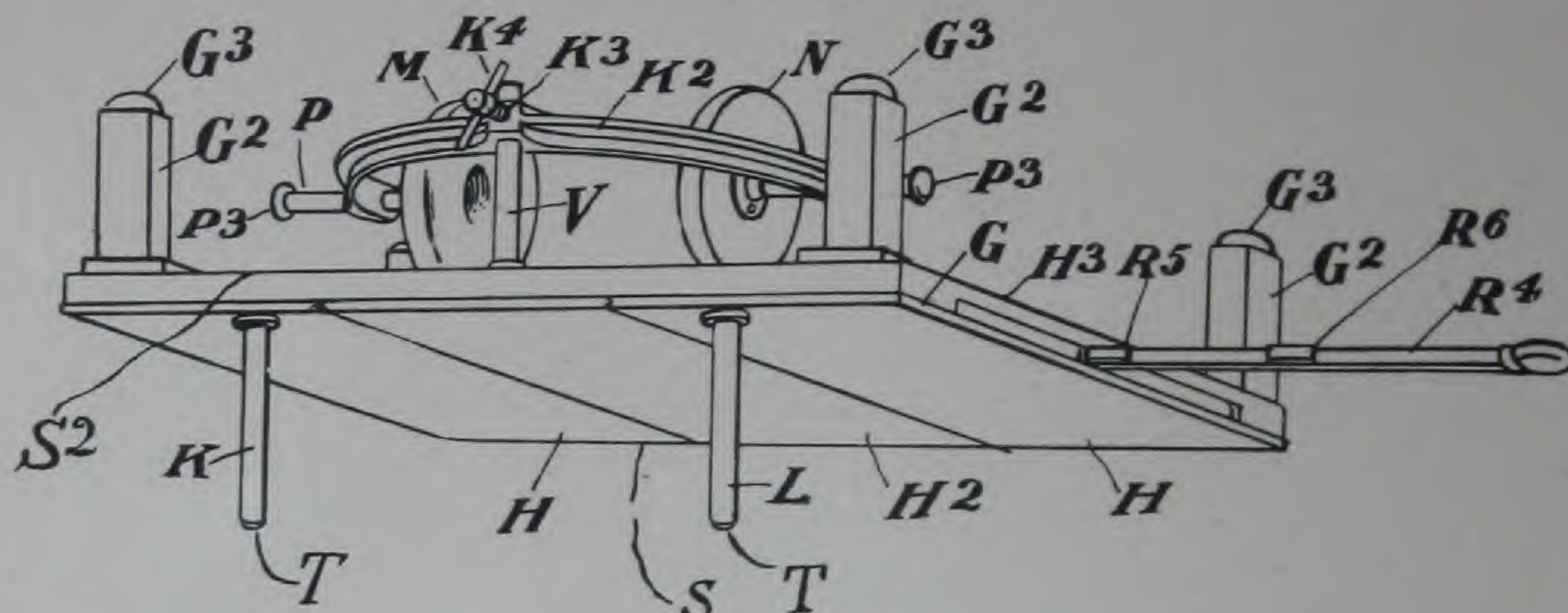
Plate No. 227.



For the convenience of operators who desire to exchange the plates in their stereoscopic work quicker than is possible with the above plate slide tunnel, we are making one after the principle of our eye localizing plate holder as illustrated in plate No. 245 (see also plate No. 228), and which some other manufacturers are trying hard to imitate. This we designate as "Stereoscopic Tunnel No. 2." It consists of two ray proof metallic shields, so arranged that both sensitive plates are placed in the slide, tandem fashion, and shifted automatically by means of a spring and trigger, the first metal ray proof shield protecting the second plate, while the first one is being exposed, then by touching the trigger the exposed plate moves to a protection beneath the second ray proof shield while the other sensitive plate is being exposed. Stereoscopic Tunnel No. 2 can be used in vertical position for making stereoscopic pictures in the upright posture as shown in plates Nos. 212, 220 and 223.

It should be borne in mind that stereoscopic tunnels of this type, when constructed to accommodate *very large* plates, must necessarily be very bulky and heavy.

Plate No. 228.



Another very desirable form of plate tunnel for stereoscopic work when plates not larger than 8-inch by 10-inch are used is our Stereoscopic Tunnel No. 4, as shown in inverted position plate No. 228. For stereoscopic exposures of the frontal sinus, antrum and other parts of the face the tunnel should be used in the position as illustrated. The swivel clamp being used to hold the patient's head firmly in position.

This tunnel can also be used very advantageously in making stereoscopic pictures of the limbs and extremities. When the tunnel is in position, as illustrated, the entire surface of an 8-inch by 10-inch plate will be exposed to the rays. But should the instrument be inverted, two exposures can be made on a single plate as "H and H" are ray proof, "H²" being transparent to the rays.

**PRICES VOID
SEE SUPPLEMENT**

**THE
KELEKET GRAVITY
INSTANTANEOUS
PLATE CHANGER**

For Stereoscopic Work

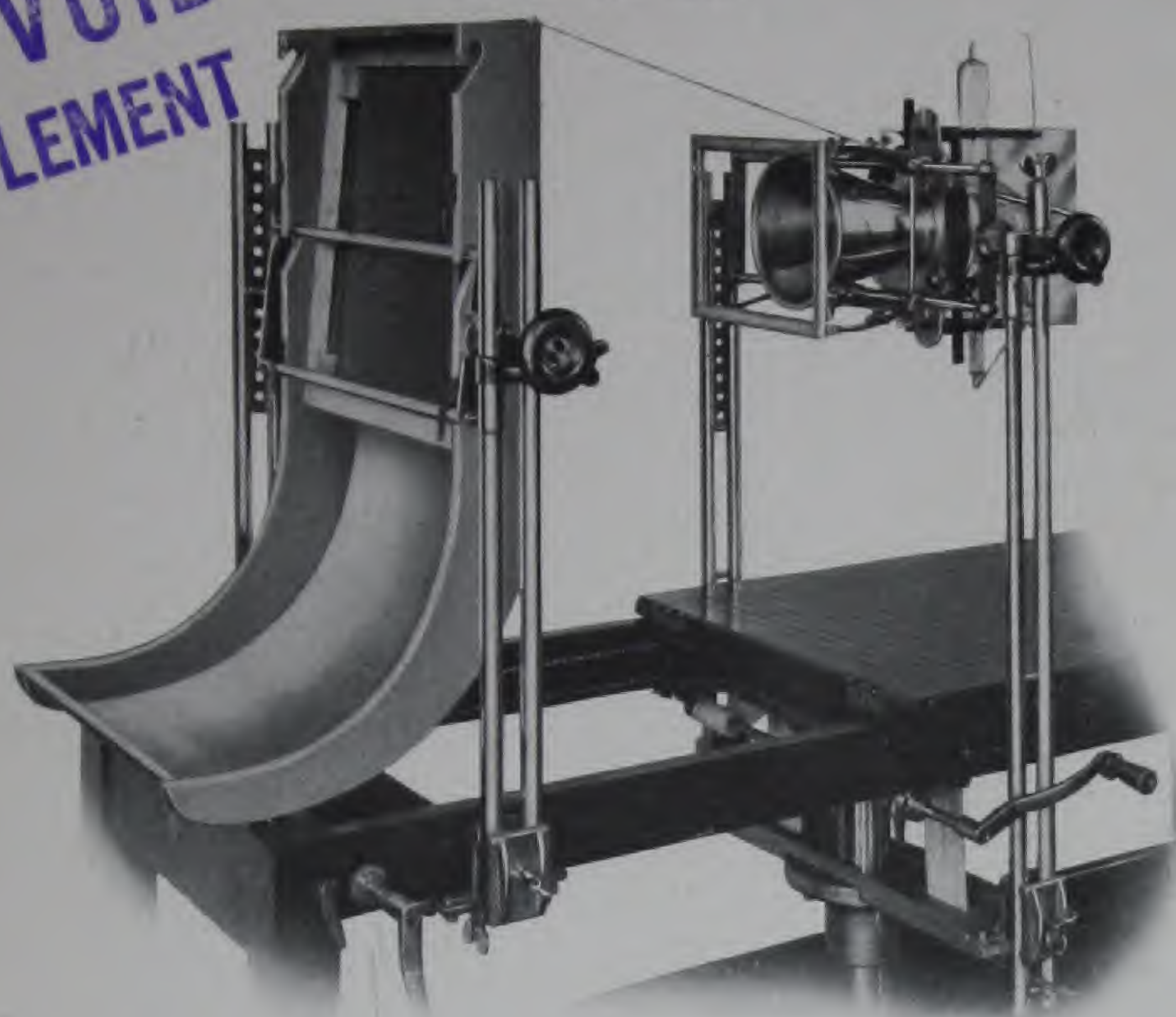
Price, \$20.00

Plate No 229.



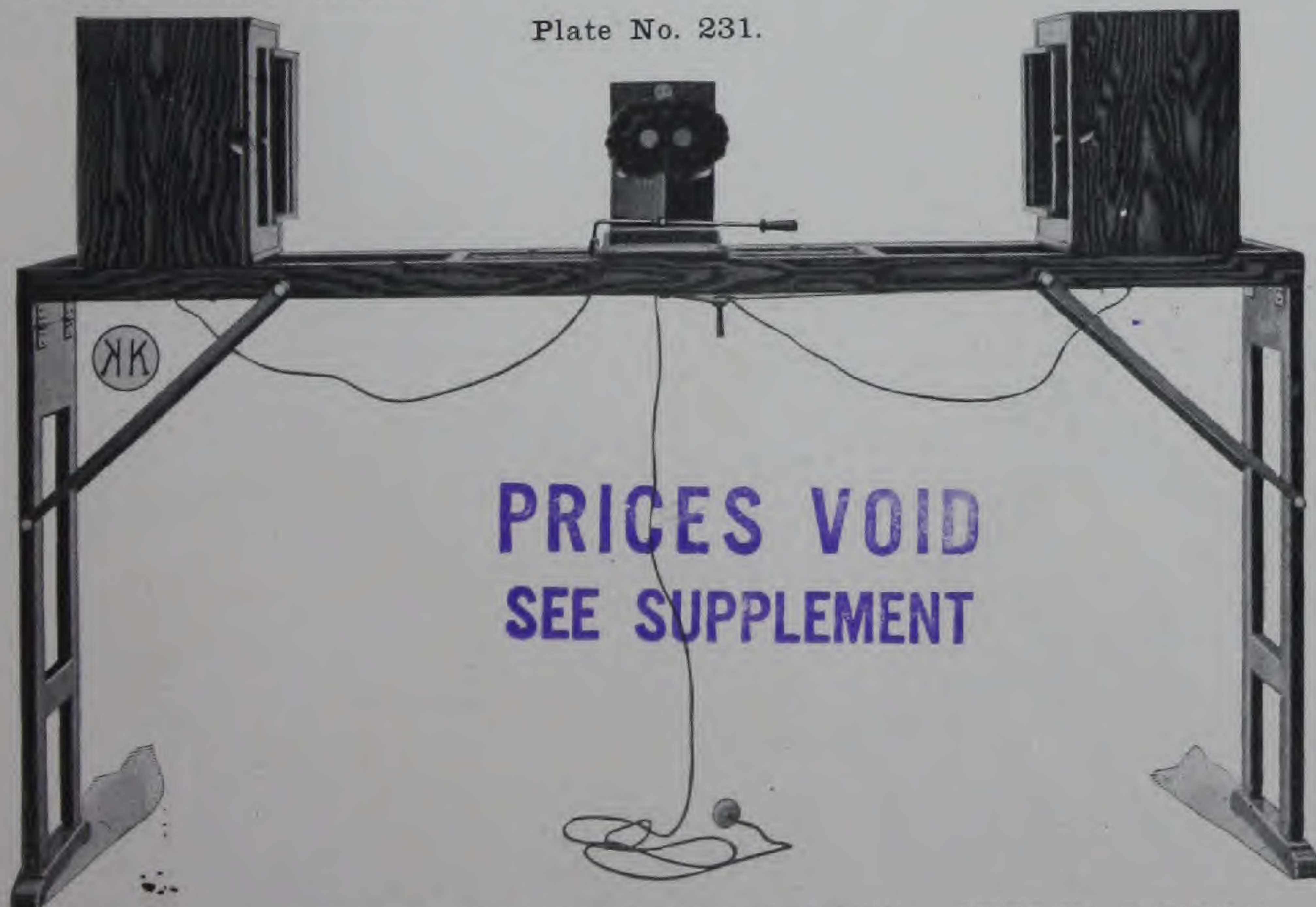
**PRICES VOID
SEE SUPPLEMENT**

Plate No. 230



Our Gravity Instantaneous Plate Changer will accommodate 11x14 plates and smaller sizes. It is so constructed that two plates can be placed in it at once, the lead backing of the first plate protects the second for the first exposure. A cord attached to a trigger on our "Type F" diaphragm causes the tube carriage to move horizontally (or vertically) and changes the angle to correct position for the second exposure and in so doing the trigger attached to the plate slide automatically releases the exposed plate, which slides down the chute carrying the lead protector with it, leaving the second plate in position for the second exposure—the tube and plate are changed in one second.

Plate No. 231.



**PRICES VOID
SEE SUPPLEMENT**

THE K-K STEREOSCOPE FOR VIEWING STEREOSCOPIC
X-RAY PLATES.

For dimensions, prices and further information relative to stereoscopes, see page 45, K.-K. Catalogue No. 18.

Operators who may be especially interested in stereoscopy of the mastoid, the sinuses of the head and face, the teeth and all other very small areas will find the tunnel base of our latest type of eye localizer as illustrated in this issue to be admirably suited for such exposures. (See pages 36 and 43, Plate 245.)

This little plate holder tunnel accommodates 5-inch by 7-inch plates only, both stereoscopic exposures are made on one plate and the same can be successfully viewed through an ordinary parlor stereoscope.

This is the stereoscopic tunnel that is used by Dr. Sidney Lange in his stereoscopy of the mastoid.

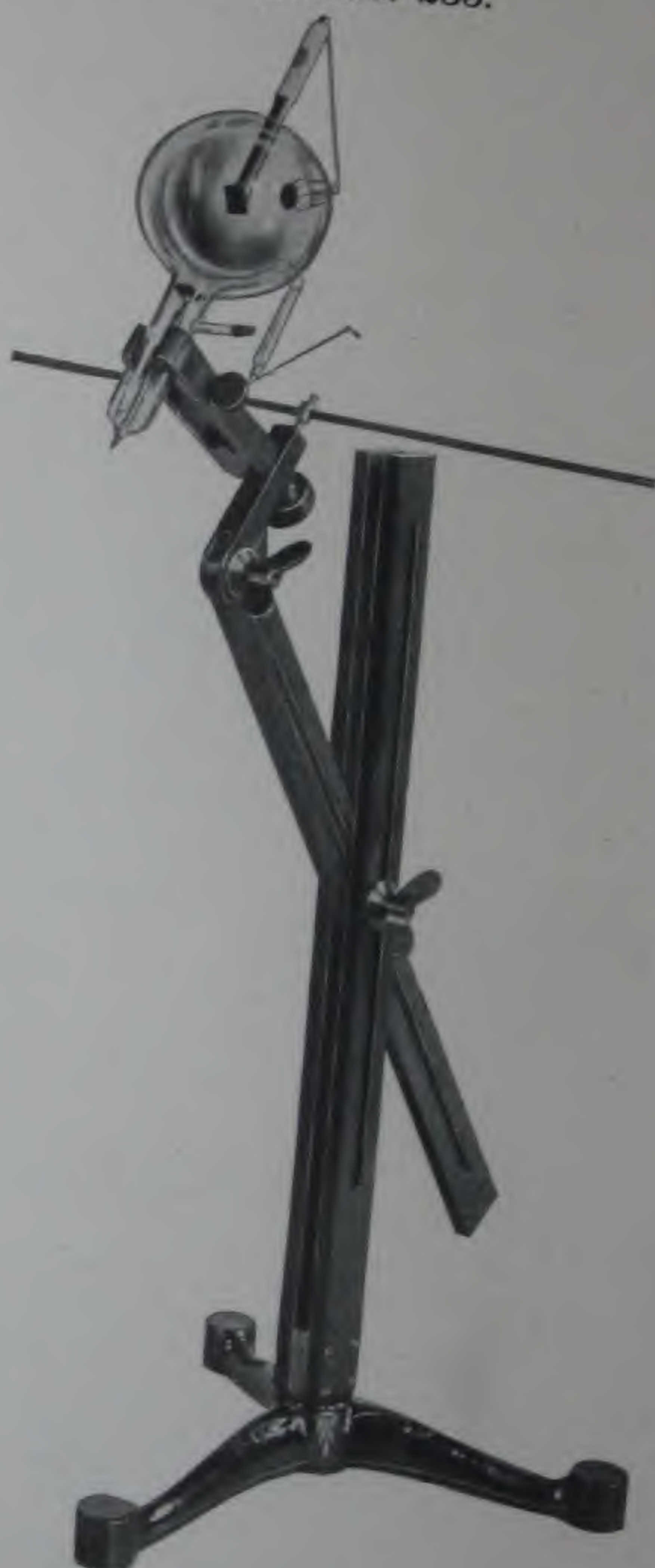
Plate No. 232.

Price \$20.00

Plate No. 233.



UNIVERSAL No. 1
Price, \$10.00



UNIVERSAL No. 2
Price, \$12.50

This type of Tube Stand has been made by our firm for the past seven years. Hundreds of them are in daily use and we have never yet received a complaint relative to them. Any adjustment from the floor to over six feet high can be secured and all parts are made rigid by tightening but one hand-screw. The movements are all free and easy, and the arm can never "stick." This feature will be recognized by experienced operators as a great improvement over most all other low priced tube stands.

Plate No 234.

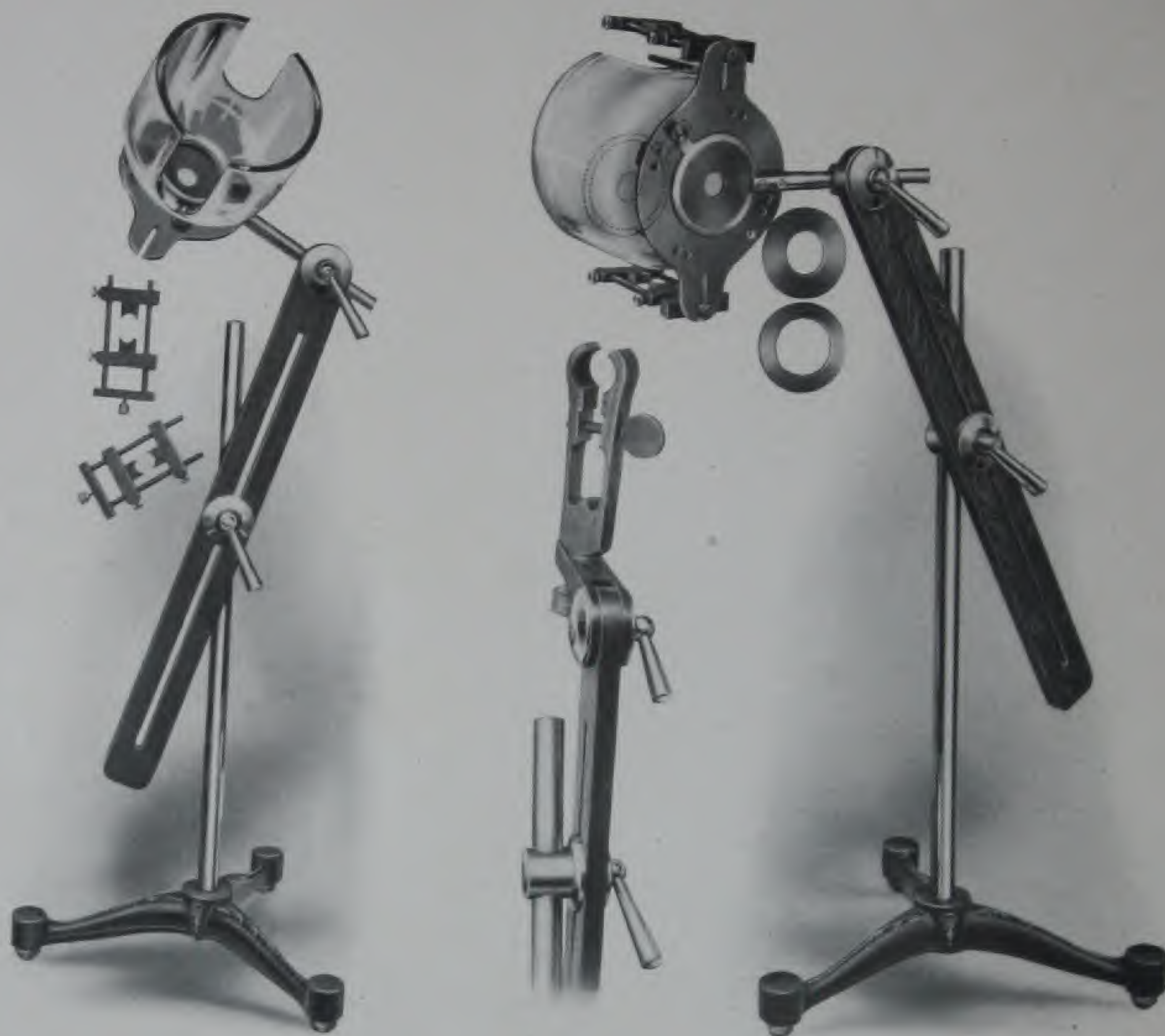


UNIVERSAL No. 3

Price, \$15.00

Operators who may require an exceptionally strong, heavy and rigid Tube Stand will find just what they are looking for in our "Universal No. 3." We have designed this type of tube support to meet the demand for a tube holder that is strong enough to take care of any size of X-Ray tube when encased in any of the various types of tube shields that are on the market. We equip this type of stand with our regular Universal ball castors.

Hospitals and sanitariums should specify our Universal No. 3 tube stand because of its great stability, rigidity and durability. The base of this stand is japanned and gilt pointed, other metal parts are heavily nickel-plated and polished. It can not "stick" or become unmanagable



DIAPHRAGMED No. 4
Price, \$30.00

This Tube Stand is the same as our "Universal No. 3," with the addition of our regular cut lead glass shield, interchangeable diaphragms, and tube holders.

Kindly note the K-K method for exchanging the diaphragms in this type of tube holder. Everything is mechanically perfect. That our designer knows his business, seems to be appreciated by competing firms, as most of them are content to copy his ideas without material change.

A set of three diaphragms is supplied with each stand, but operators can cut additional diaphragms from sheet lead, in any desired shape of aperture to suit their therapeutic requirements.

Plate No. 236.



Plate No. 237.



Plate No. 238.



DIAPHRAGMED No. 5

Price, (with Tube Shield, one Cone, 8 x 10 Plate Holder and Clamps Complete) **\$63.00**

Extra Cones, \$8 Each

"One good thing after another," is the expression of operators who have examined the KELEKET line of tube stands. This compression diaphragmed tube stand was the first practical instrument of its kind produced in America, and although imitators are both numerous and active, it is still the only practical low priced instrument made that will do the work required of it.

The shield, diaphragms, centering rod and cones of this tube stand are all interchangeable with those of our other tube stands and compression tables. This instrument can be used in conjunction with any table and can be adjusted beneath a table, cot or stretcher as well as above it.

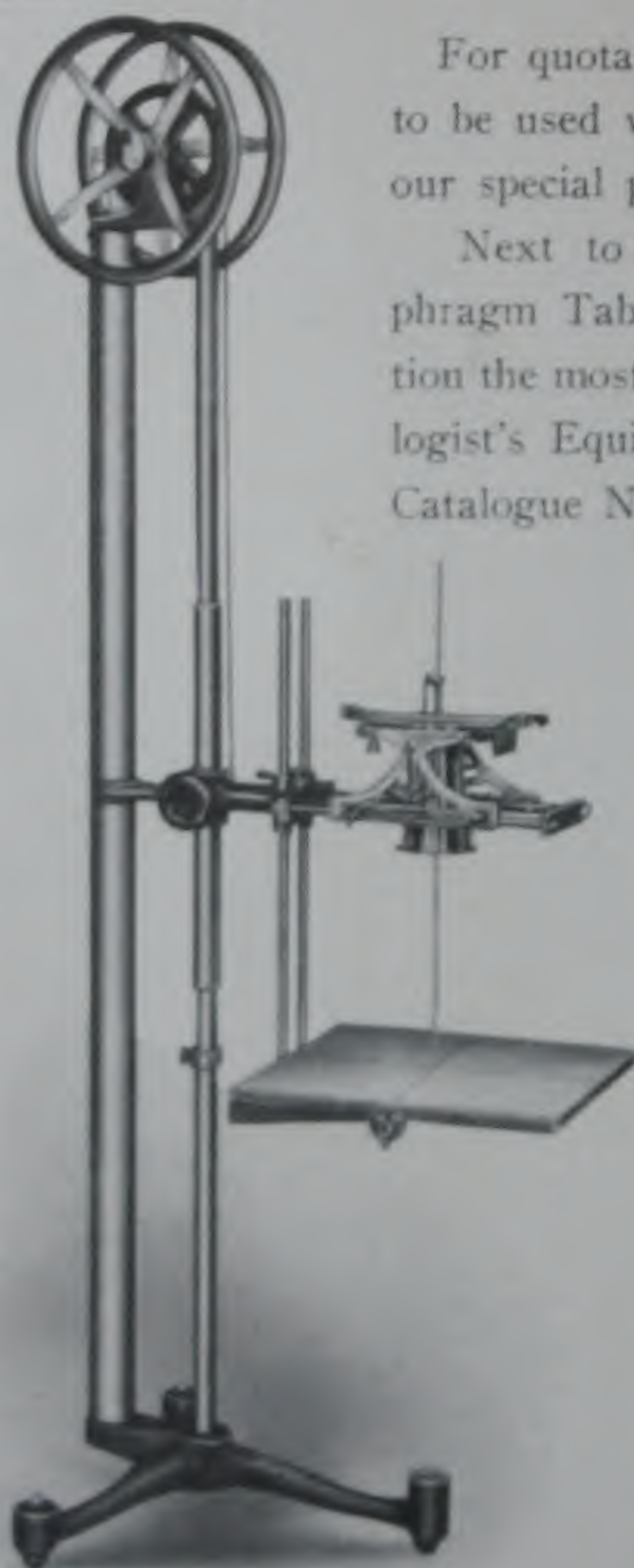
**PRICES VOID
SEE SUPPLEMENT**

STEREOSCOPIC No. 6

Price, (with Tube Shield, one Cone, 8 x 10 Plate Holder and Clamps complete) \$100.00

Extra Cones, \$8.00 each

Plate No. 239.



For quotations on additional accessory devices to be used with this instrument, please refer to our special price list and order blanks.

Next to our "Type F" Compression Diaphragm Table, this instrument is without question the most valuable addition to the Roentgenologist's Equipment since the publication of our Catalogue No. 18.

It is so very complete, covering as it does practically the entire field of diagnostic and thereapeutic Roentgenology that it is really very difficult to find a name or a combination of titles for it.

It is not alone a "*Universal Protected Diaphragmed Stereoscopic Counterweighted Compression Tube Stand and Table*," but it is at the same time an Orthodiograph and a Diagraphoscope combined in one compact instrument.

Plate No. 240.

This apparatus has its own detachable and interchangeable plate and screen holder, which moves in unison with the X-Ray tube, always being in correct alignment with it; but the lateral movement of the X-Ray tube is independent of the plate holder which is essential for stereoscopic and localization purposes. We shall refrain from tiring our readers with a minute detailed technical specification of the composition and construction of this piece of apparatus. Our several illustrations are, we believe, sufficiently clear to convey the general manner of construction and we are content to rely upon the intelligence and ingenuity of our patrons to apply the apparatus in a manner best suited to their particular requirements.

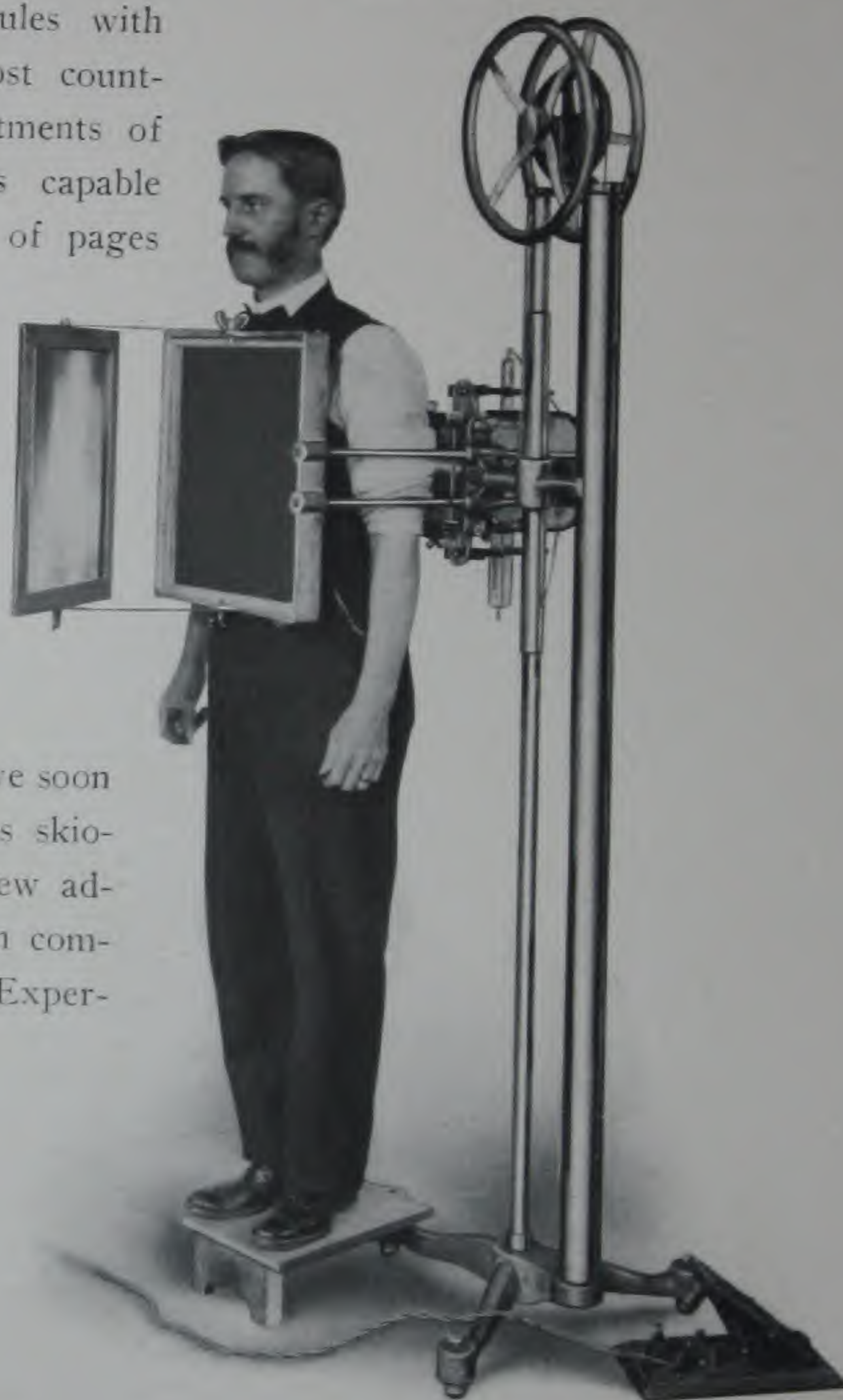


Plate No 241.

To write a set of rules with illustrations of the almost countless positions and adjustments of which this apparatus is capable would require hundreds of pages and innumerable engravings.

In this connection we desire to call attention to the fact that we have no "Microscopic" fine screw adjustments to offer you. We used to make them that way, but we soon learned that instantaneous skio-graphy and snail-like screw adjustments have nothing in common with each other. Experienced operators will understand.

The makers of this Tube Stand have had nearly ten years experience in designing X-Ray apparatus exclusively, and we tell you in all frankness and sincerity, that writers who claim that the manipulation of such a universal appliance can be "mastered in fifteen minutes," simply prove their lack of experience and knowledge of the subject which they are trying to teach.



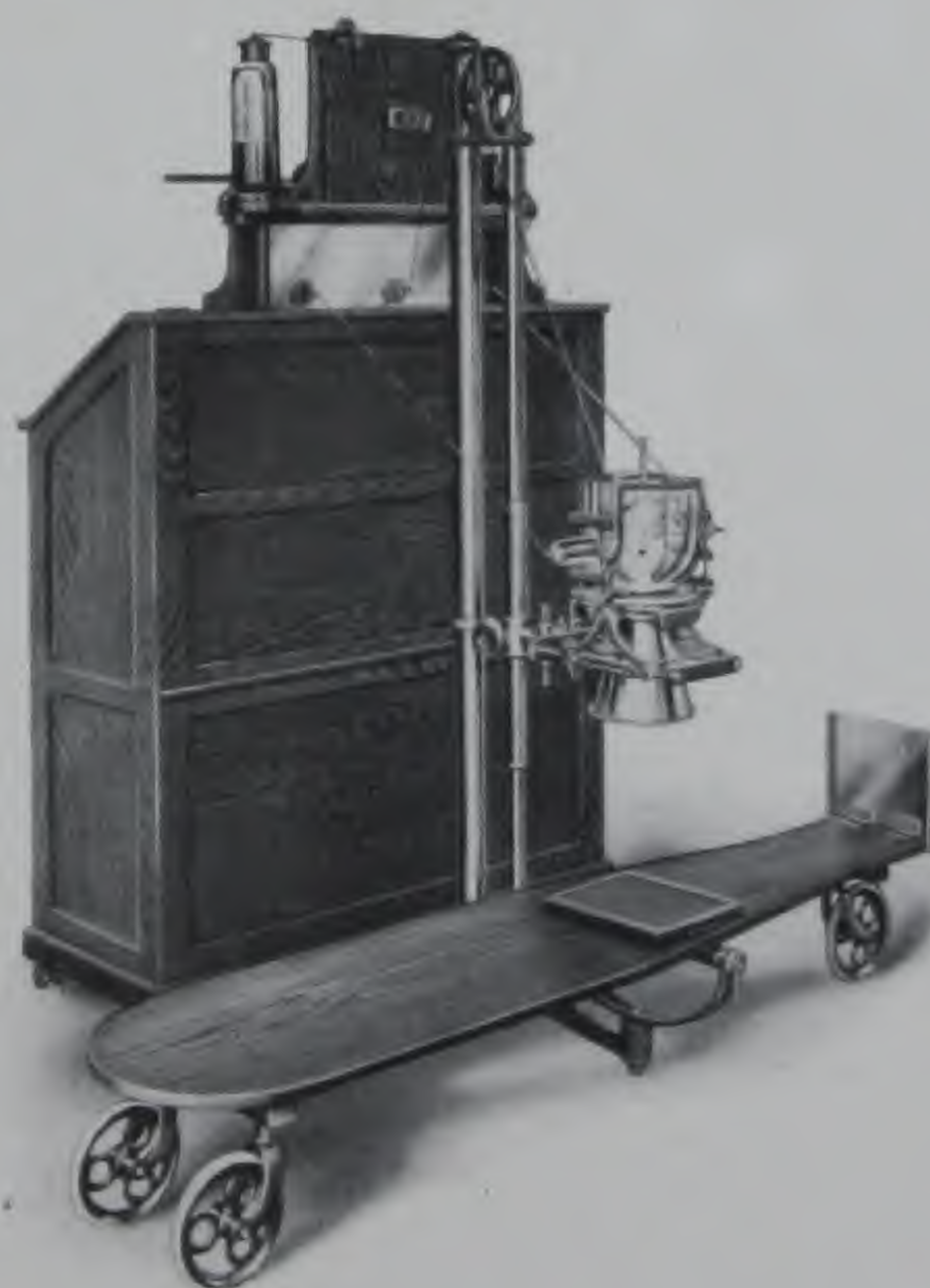
As the designers and makers of this Tube Stand, we should understand it pretty well and yet we are constantly finding new and important uses for it. Users of it frequently call our attention to some new and important combination of adjustments that would not be possible with any other type of compression apparatus.

This Tube Stand is a practical piece of apparatus of pleasing design. Each part bears its correct relation as to size, strength and weight to all other parts, so that there is no superfluous bulk or weight. The "massive weighted cast-iron legs" of great spread, as boasted of by some other makers are not required with this appliance and yet it is more solid and rigid than any other. OUR UNIVERSAL LOCKING BALL CASTORS make the apparatus easily transportable or rigid and solid at will and instantly. OUR STEREO-SCOPIC TUBE STAND No. 6, is not a drill press or a machine, but an instrument of precision for instantaneous accuracy in applying the Roentgen Rays stereoscopically and otherwise.

It is a basic standard with which all localizing and other accessory devices can be used the same as with our Type F Compression Table. This stand can be used in conjunction with any table or stretcher and the light can be directed from either above or below, as the case may require. We strongly recommend the use of our Special Wheel Table, as shown in the accompanying illustration, because of its ease of manipulation and the fact that it can be removed from the floor and hung upon a nail on the wall, just the same as you would hang up your coat to get it out of the way when not in use.

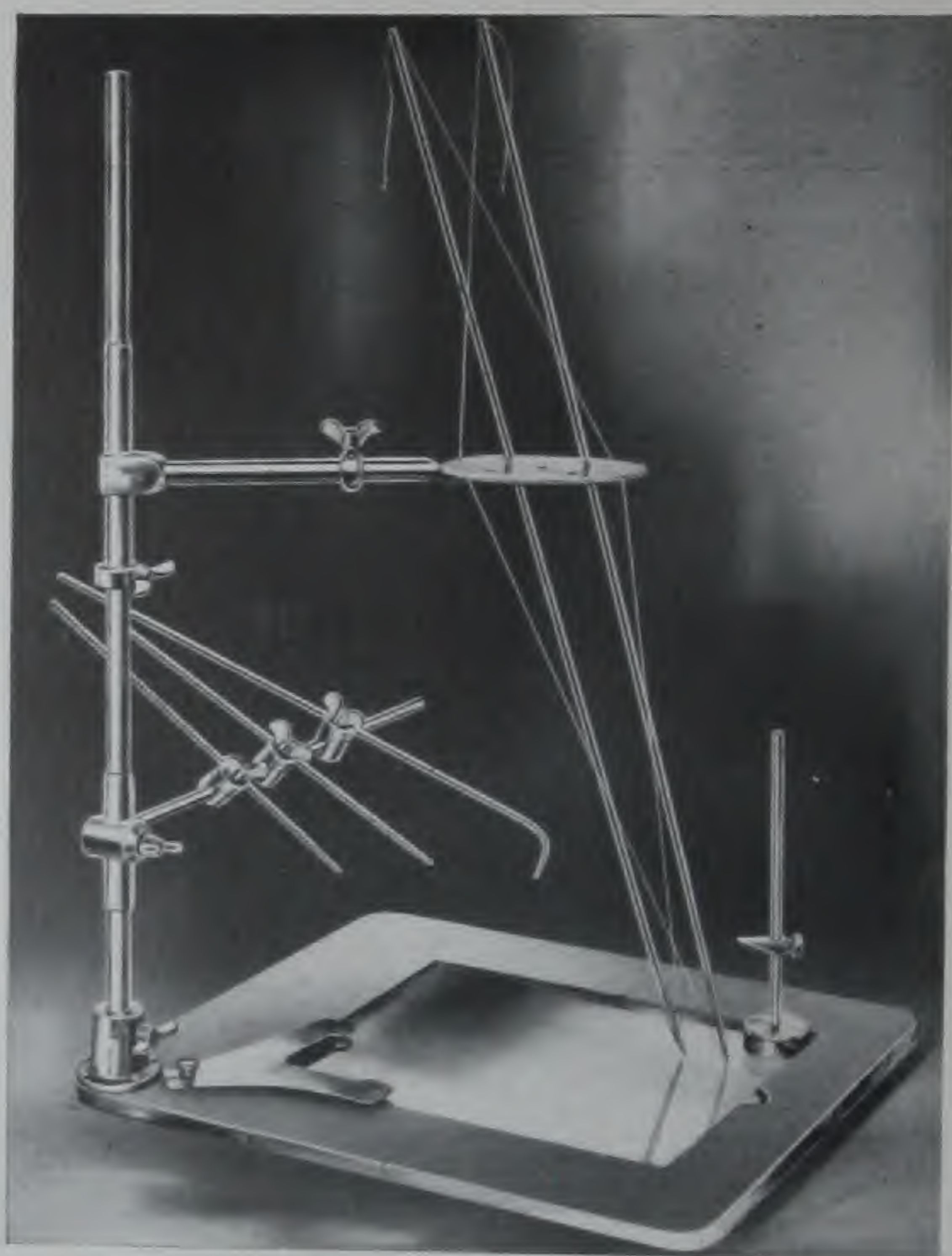
The stereoscopic mechanism of this Tube Stand is exactly the same as that of our Type F Table, as is the lead glass shield, diaphragms and cones, and all of these parts are interchangeable one with the other.

Plate No. 242.



An Indicator for the Correct Localization of Bullets, Needles and Other Foreign Objects in the Human Body by means of the X-Rays.

Plate No. 243.



This little instrument is not alone a "Localizer," which term, as applied to other existing devices, means a theoretical combination of parts so intricate that a score or more pages are required to explain its use; it is far more,—an instrument with which an X-Ray operator can, within a few moments, adjust and clamp an indicator rod in rigid position so that it will point directly to an imbedded shot or other object as truly as a needle, when properly poised will point to a magnet, and at the same time it actually indicates the depth of the object, showing its horizontal plane from all sides and continuing to do so throughout the operation for its removal.

This instrument embodies the McKenzie Davidson Cross-thread idea, but it has been so simplified and perfected that it can be used with any compression table or by the open method, the tube being supported in the ordinary way and shifted an equal distance on either side of the perpendicular. The instrument and plate-holder base are made entirely of metal, so as to be easily sterilized for use on the operating table. The two straight and one curved rods attached to horizontal bar are simply markers to enable the replacing of subject, in its original position, on the base for operation.

This Localizer consists of four general parts:

FIRST.—An aluminum plate-holder.

SECOND.—Three adjustable skin markers.

THIRD.—Two metal rods and a round disc for holding two silk threads to occupy the exact position as did the X-Rays from a double exposure on one plate.

FOURTH.—The indicator rod, supported by a universally jointed friction sheath so that its lower end can be adjusted to the crossing of the two silk threads and locked in that position. The rod can be pushed upward but its attached lug as shown in illustration, will prevent its descending lower than the fixed position at the crossing of the two silk threads which represents the exact location of the foreign body.

Plate No. 244.



TECHNIQUE FOR USING THE LOCALIZER IN CONJUNCTION WITH OUR STEREOSCOPIC TABLES AND TUBE STANDS.

FIRST.—Remove the upright standard and all attached parts from the plate-holder base and place the latter on the table with its long side either cross or lengthwise, as may be preferred.

SECOND.—Place an 8x10 photographic plate (encased in opaque envelope) in position on the plate-holder and tighten the "Y" shaped marker clamp at the corner by thumb screw, as provided.

THIRD.—Place the patient on the table with the affected part resting on the plate-holder, the supposed location of the bullet or other foreign body being approximately over the center of the photographic plate.

FOURTH.—The small upright standard (not shown in cuts) must now be attached to the uncovered edge of the plate-holder base, so that its horizontal arm will project above the person of the subject to indicate the plate's center.

FIFTH.—The diaphragm carriage with all parts in true vertical adjustment, must now be brought into position with its centering rod pointing to the exact center of the plate beneath the patient, the same being indicated by the horizontal arm attached to the marginal standard, as referred to in rule four.

SIXTH.—The stop lug attached to horizontal carriage frame must be set at center, so as to restrict the tube's lateral movement an equal distance on either side of a line perpendicular to the center of the photographic plate, and the end lugs attached to the diaphragm carriage must be set at greatest separation, so that the tube's lateral movement will correspond with the notches in the thread-holder disc, as shown in our first illustration.

SEVENTH.—Remove the centering rod, place tube in position on the diaphragm carriage, use large cone, lower the "camera" to any desired height, preferably to a point just short of touching the patient's person, or still closer if you care to remove the cone, the closer you bring the light to the subject the greater will be the separation of the two shadows of foreign body on the plate, which is some aid to accuracy in localization. Push the tube carriage to the right as far as it will go and make the first exposure, then to the left as far as it will go and make the second exposure. *The tube, diaphragm and cone must not be tilted as in stereoscopic work.*

EIGHTH.—Run the tube carriage to either end of the table to get it out of the way, but do not disturb its vertical adjustment. Caution the patient to not move until directed to do so.

NINTH.—Place the large vertical standard in position at the corner of plate-holder with lower horizontal arm and the three marker rods adjusted a few inches above the upper plane of the subject. Adjust the three rods so that their points will touch the surface of the subject at three widely separate locations, then make a dot on the skin of the patient (silver nitrate) at each of the points. Adjust a ring collar on upright standard at the lower edge of this sliding bracket to preserve its vertical adjustment. See that the three marker arms are securely clamped to their supporting rod, after which the same may be detached and the patient removed from the table.

TENTH.—The plate having been developed, it is replaced in the holder base, film side up, with a piece of white paper beneath so that the images of the foreign body can be more clearly seen. A freshly developed plate can be charted while wet. The plate must be so placed that the "Y" shaped marker at corner will align with its image.

ELEVENTH.—Place the round, thin disc in position on the large, vertical standard, as shown in our first illustration. The vertical position of the X-Ray tube being the same as when the exposures were made, the disc can now be accurately adjusted to the same level by sighting along its top surface into the focal dot of the tube's target; this being done, the notches on either side of the disc will occupy the same position with reference to the plate as did the focal point of the tube when the two exposures were made. Adjust a ring collar on upright standard at the lower edge of the discs supporting bracket to preserve its vertical adjustment.

TWELFTH.—The pointed ends of the two rods carrying the silk threads are now placed upon the images of the foreign body, which is being localized, their upper ends being supported by passing through suitable holes in

the metal disc. The silk cords are crossed so that they lead to the two notches in the metal disc above, which correspond to the focal points of the tube, because the ray of light that made the image at the right, came from the tube's target when at the left and conversely the image at the left was made by the ray from the tube's target when at the right. The silk threads are made taut by drawing their ends through notches in the upper ends of their attached rod supports, springing the latter slightly. (Refer to first illustration.)

THIRTEENTH.—Set horizontal arm on small vertical standard (the same as used for indicating the plate's center, see rule 4). So that its surface is on the same plane as the crossing of the silk cords.

FOURTEENTH.—Remove the silk cords with their attached rods and disc and substitute therefor the universal joint and indicator rod as shown in our second illustration.

FIFTEENTH.—Lower the indicator rod until its lower end rests upon the photographic plate at a point midway between the two images of the foreign body, and lock its supporting sheath at that angle by means of the large thumb screw at end of the horizontal arm.

SIXTEENTH.—Adjust the indicator rod upwards so that its lower end will be on the same plane as the horizontal arm of the small vertical standard, which is the same as the crossing of the silk threads, as referred to in rule 13.

SEVENTEENTH.—The end of the indicator rod now being in the exact spot as the foreign body was when the patient was in position on the plate-holder base, the stop lug on its upper end should be lowered to the top of the metal sleeve and clamped so that when the rod is raised to the plane of the patient's body, when replaced, the position of the lug above the metal sleeve will indicate the depth of the foreign body from the upper surface of the subject and an incision through which this (sterilized) probe can pass will lead the surgeon directly to the foreign body.

EIGHTEENTH.—The Localizer can now be disassembled for sterilization before operation, but due care must be exercised to not disturb the adjustments of the record parts, such as the two fixation collar rings on the main vertical standard, the three marker rod knuckles, the universal joint clamp and the stop lug attached to the indicator rod. The indicator rod itself can be withdrawn, its horizontal supporting arm can be removed from the vertical standard as can the horizontal arm to which the three marker rods attach and the vertical standard itself can be removed from the base, so that a medium sized sterilizer can be employed.

NINETEENTH.—For operation the metal plate holder base (without the plate) is placed upon the operating table and the subject placed upon it in the same position as when the pictures were made. To accomplish this proceed as follows:

Place the vertical standard in position in socket at corner of the base, raise the lower bracket slightly, then attach the horizontal arm to which the three marker rods are adjusted, lower the bracket back to its ring collar moving the subject slightly until the three (silver nitrate) dots on his skin correspond with the ends of the three marker rods.

TWENTIETH.—Place the upper horizontal arm, universal joint and indicator rod in position above the subject (see second illustration). Push

the indicator rod downward until the point touches the patient's body. The rod will point to the foreign body, the depth of which will be indicated by the distance of the lower edge of the stop lug above the metal tubing, through which the rod passes.

Referring back to Rule "Fourth"—for centering the tube perpendicular to the center of the photographic plate after the patient has been placed in position upon the latter, some operators report that they prefer to use the thread holder disc attached to the large upright standard, instead of the small pointer. This disc as shown in our first illustration (threads omitted) can be lowered to the level of the patient's body and its center hole will be exactly perpendicular to the center of the photographic plate beneath the patient and the tube will be centered when the centering rod is vertically above this hole.

The Localization of Foreign Bodies in the Eye and Orbit by Means of the Roentgen Rays, KELEKET LOCALIZER—SWEET METHOD.

Plate No. 245.



(PATENT NO. 965,195)

Price, \$35.00.

Since the Roentgen Rays were first successfully used in the localization of foreign bodies in the eye, the apparatus and technique for such work has been elaborated, simplified, abridged and perfected commensurate with the general advance of the science of Roentgenology.

As manufacturers of X-Ray apparatus exclusively, we can find time to investigate, experiment and to finally accomplish the production of appliances for specific purposes that are more nearly correct than other instruments costing several times as much that are produced by makers whose efforts are not so fully concentrated.

A very important feature of this localizer as well as other Roentgen appliances of our design is that parts of it can be used most successfully for a number of purposes besides eye work, as will be explained further on in this article.

The KELEKET Eye Localizer consists of two general parts:

FIRST.—The base or head rest, as illustrated in Plate 245.

SECOND.—The Localizer as shown in Plate 246 and as shown in detail in outline drawing, Plate 247.

The head rest base is composed of the following parts:

FIRST.—A plate slide tunnel so constructed as to protect one-half of a 5-inch by 7-inch photographic plate while the other half is being exposed and to further protect the exposed half while the second exposure is being made.

SECOND.—Four rubber tipped legs to raise the tunnel so that it will act as a pillow to hold the patient's head level when lying on his side.

THIRD.—A plate holder having a slide that will protect the plate from ordinary light, but offer no resistance to the X-Rays.

FOURTH.—An arm or handle attached to the plate holding slide to enable the operator to shift the plate the correct distance for each exposure, and to withdraw the same when both exposures have been made.

FIFTH.—A pneumatic cushion for the comfort of the patient.

SIXTH.—A double clamp to hold the patient's head to prevent any horizontal movement.

SEVENTH.—A single vertical clamp to press the head downward upon the pneumatic cushion thereby obviating any necessity for the unsanitary sand bag.

EIGHTH.—A thin aluminum removable covering for the stand having alignments that indicate the size and shape of the part of plate being exposed to the rays, as well as a center indication which shows the position the eye should occupy and the point at which the central rays should be directed by means of the centering rod as shown in accompanying illustrations.

The Localizer proper as illustrated in Plates 246 and 247, consists of:

FIRST.—A heavy metal base, Figure 2 (Plate 247.)

SECOND.—An upright standard B to support the Localizer and permit the same to be adjusted and held firmly at any desired height.

THIRD.—The indicator ball D with its needle supporting stem D2 which when properly adjusted to the center of an eye will cast its shadow on the photographic plate and serve as a landmark indicating the center of the cornea.

FOURTH.—The metal tip E of stem E2 is made cone-shaped so as to more easily differentiate its shadow from that of ball D. These indicators are permanently adjusted a known distance apart (15 m m) so that when an X-Ray picture is made of them obliquely, when adjusted to an eye as above stated and as indicated in "front view" on the chart, we are enabled by their shadows to definitely locate the source and course of the rays of light (in relation to the chart) that caused the shadows and in turn the position

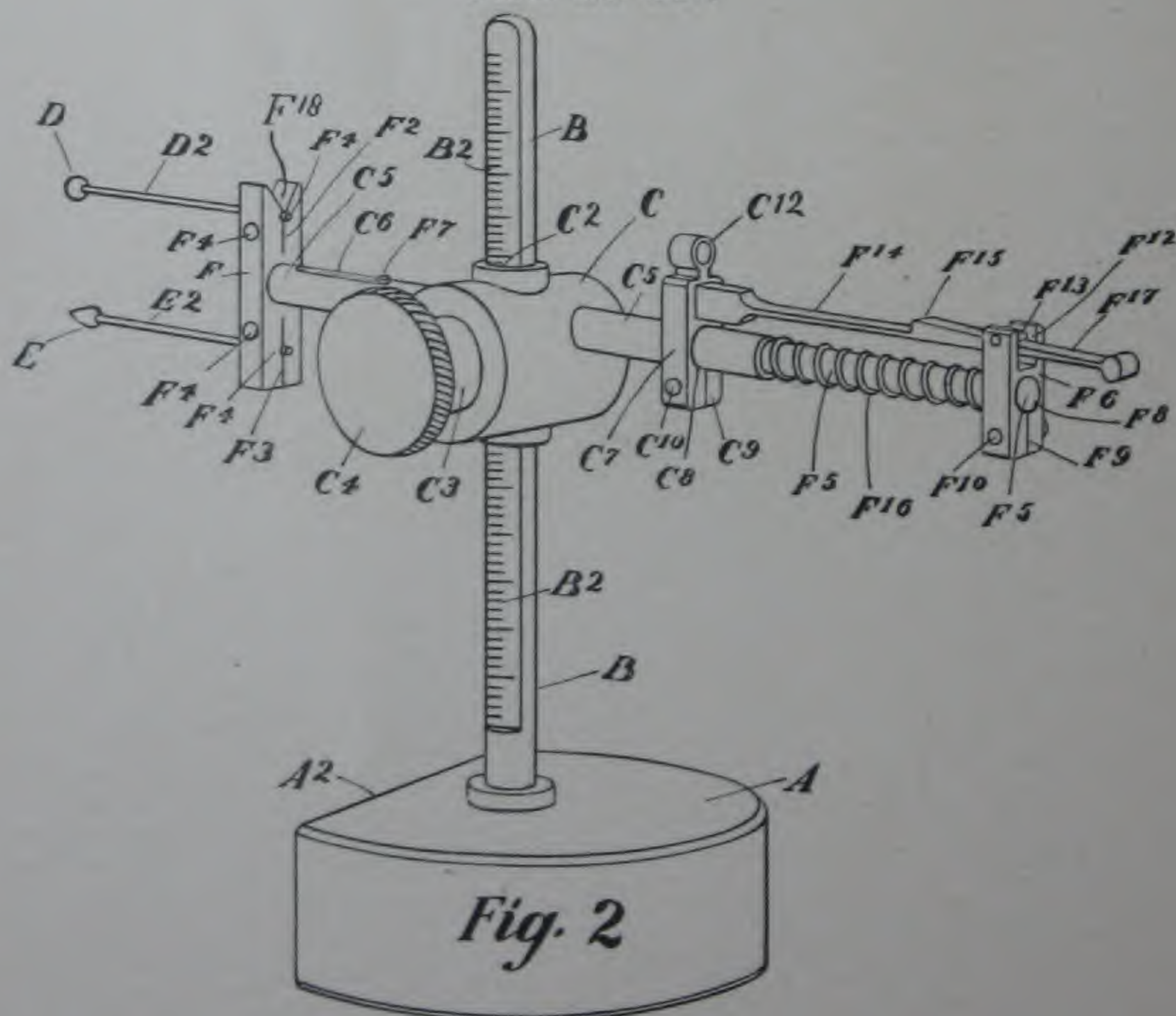
Plate No. 246.



of any foreign body that may show on the same plate, can very easily be determined by the position of its shadow in relation to that of the ball and cone because the exact position of the latter with reference to the chart is known and indicated (front view).

FIFTH.—Tube C12 and notch F18 are sights similar to those used on a rifle, with which the operator can accurately align the center of the cornea of the afflicted eye with ball D and its supporting stem D2.

Plate No. 247.



F14 is a spring trigger which presses upwards against pin F13. F5 is the end of the rod to which the indicator ball and cone D-E are attached by bracket F, the whole being supported by passing through tube C5. Spring F14 being attached to stationary tube C5 by means of bracket C7, rod F5 with bracket F6 can be pressed forward until pin F13 is engaged by notch F15.

SIXTH.—By loosening set screw C4 the bracket C can be raised or lowered until ball D with its supporting stem D2 is in exact alignment with the center of the cornea of the affected eye and the screw then tightened.

SEVENTH.—The patient is instructed to close his eyes and the entire instrument with its base is slid forward until indicator ball D presses into the eye lid approximately its own thickness. The trigger F17 is then depressed to disengage notch F15 from pin F13 when spring F16 will cause the rod F5 and indicator ball and cone D and E to rebound exactly ten m. m., being restricted by knob F7 in slot C6. The subject and localizer are now in correct position for making the two necessary exposures.

Plate No. 248.



THE FIRST EXPOSURE.

Place patient's head on the plate holder base with inflated cushion in position as shown in illustration, being careful that the inflated cushion does not extend over the marked lines on the aluminum cover, otherwise it might cast a shadow on the photographic plate.

Should the subject show a tendency to move about, the horizontal clamps as shown in Plate 245, should be adjusted to the base of head and forehead,

otherwise the vertical clamp, as shown in Plates 248 and 249 will be sufficient. The double horizontal clamp can be adjusted for either eye by means of its two off center holes and clamp screws, the center hole being for frontal sinus work. Operators will bear in mind that the patient's afflicted eye must be nearest the photographic plate.

Place the diaphragmed tube in position so that its central rays will exactly parallel the front vertical plane of the patient's eyes, as shown in Plate No. 248.

A fresh 5 x 7 plate having previously been placed in the plate holder, you now secure the same from your dark room and place it in the tunnel with its outer flange protruding as shown in Plate 248. This will expose one-half of the plate to the action of the rays, while the other half will be protected for the second exposure.

The localizer (Plate 246) is now placed on the stand in front of the affected eye, its trigger is "set" as already described, and after the indicator ball has been adjusted to the plane of the cornea the entire instrument is pushed forward on its base until the ball presses into the patient's closed eye lid approximately its thickness, the trigger spring is then released and the indicator ball and cone recedes exactly 10 m. m., thereby permitting the patient to open his eyes and wink them in a natural manner. By referring to localizing chart you will observe that due allowance of ten m. m. has been made by placing the indicator ball and cone just that far removed from the front plane of the cornea and it should also be borne in mind that the front of the cornea is 10 m. m. in front of the shadow of the indicator ball, as shown in your negatives.

Some object such as a candle or a white piece of paper that can readily be seen by the patient should be placed in alignment with the sights of the indicator, but several feet removed therefrom, and the patient should be instructed to look constantly at this object while the two exposures are being made.

Plate No. 249.



THE SECOND EXPOSURE.

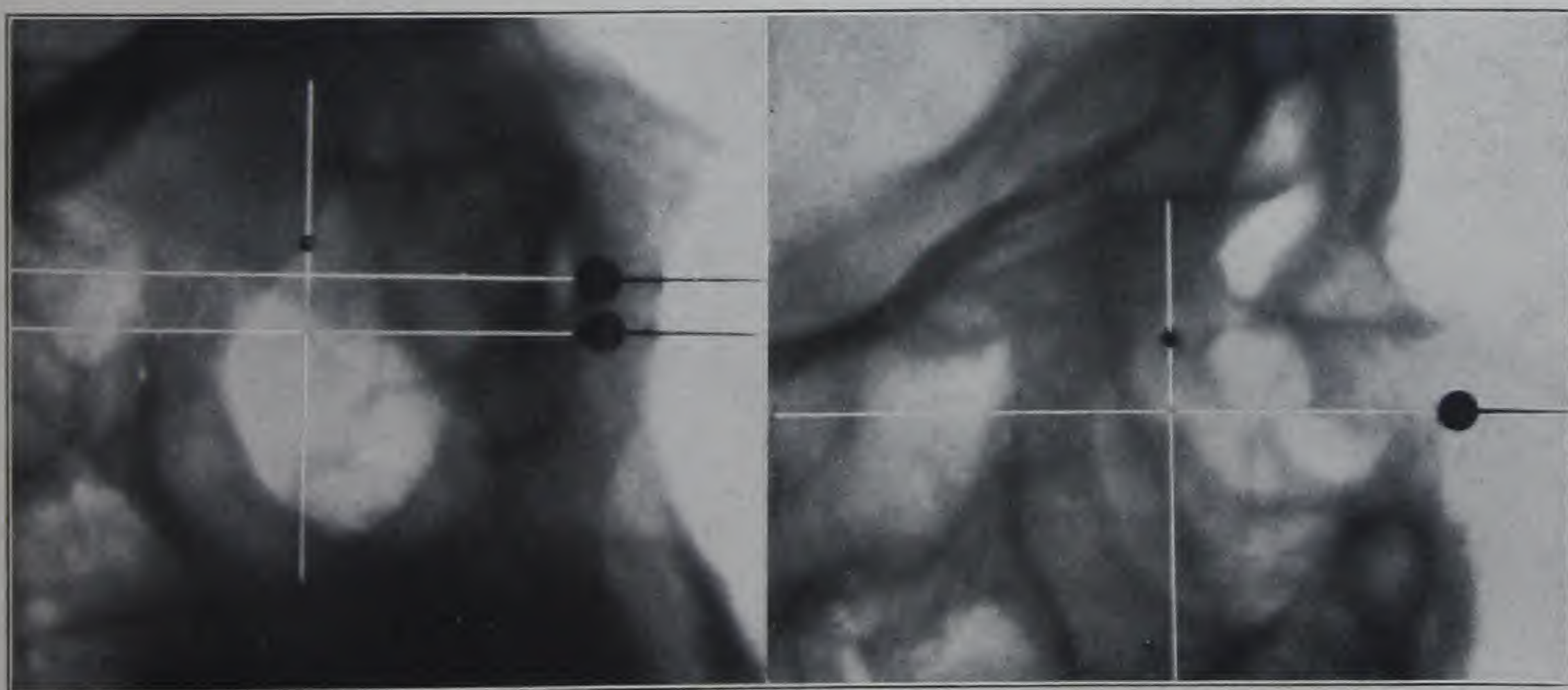
The first exposure having been made with the light perpendicular to the plane of the plate and parallel to the patient's eyes, thereby superimposing the shadows of the indicator ball and cone and their supporting stems, as shown by Plate 250 $\frac{1}{2}$, the X-Ray tube is then shifted toward the patient's feet four or five inches and tilted so that the indicator rod points to the ball of the localizer, thereby causing the central rays to pass obliquely through the center of the cornea of the patient's affected eye, as shown in Plate 249. The photographic plate must now be shifted by pushing the plate holder inward by its handle as far as it will go, thereby protecting that portion that was acted upon by the rays in the first exposure and bringing its unexposed half in proper position to receive the rays from the second exposure. In this position the second exposure is made with the light falling obliquely upon the indicators, thereby separating their shadows as is shown in Plate 250.

It should be remembered that it is not essential that the exposures be made with the light at any specific distance from the plate or even that it be the same distance for the two exposures and neither is it important that the tube be shifted an exact or known distance for the second exposure, as by the use of our charts and the Dr. Sweet method, the course of the rays are automatically established as is shown by lines F1-P and P1 and P2 in Plate 251.

The two exposures having been successfully made as above directed, the plate holder can now be removed and taken to the dark room, where it should be opened and the plate developed, and if found to be correct, the patient should be released.

Plate No. 250.

Plate No. 250 $\frac{1}{2}$.



To aid our patrons to a thorough understanding of the correct way of marking the charts for the Roentgen localization of foreign bodies in the eye or orbit, we are pleased to present herewith an example case. Plates 250 and 250 $\frac{1}{2}$ showing a shot and the same correctly localized, as shown in Plate 251.

Upon negative 250 $\frac{1}{2}$, which represents the first exposure a line is drawn through the horizontal axis of the indicator ball and cone which are here superimposed, thereby projecting their supporting stems and establishing the visual axis of the eye.

A second line is drawn at right angles to the first through the center of the foreign body's shadow.

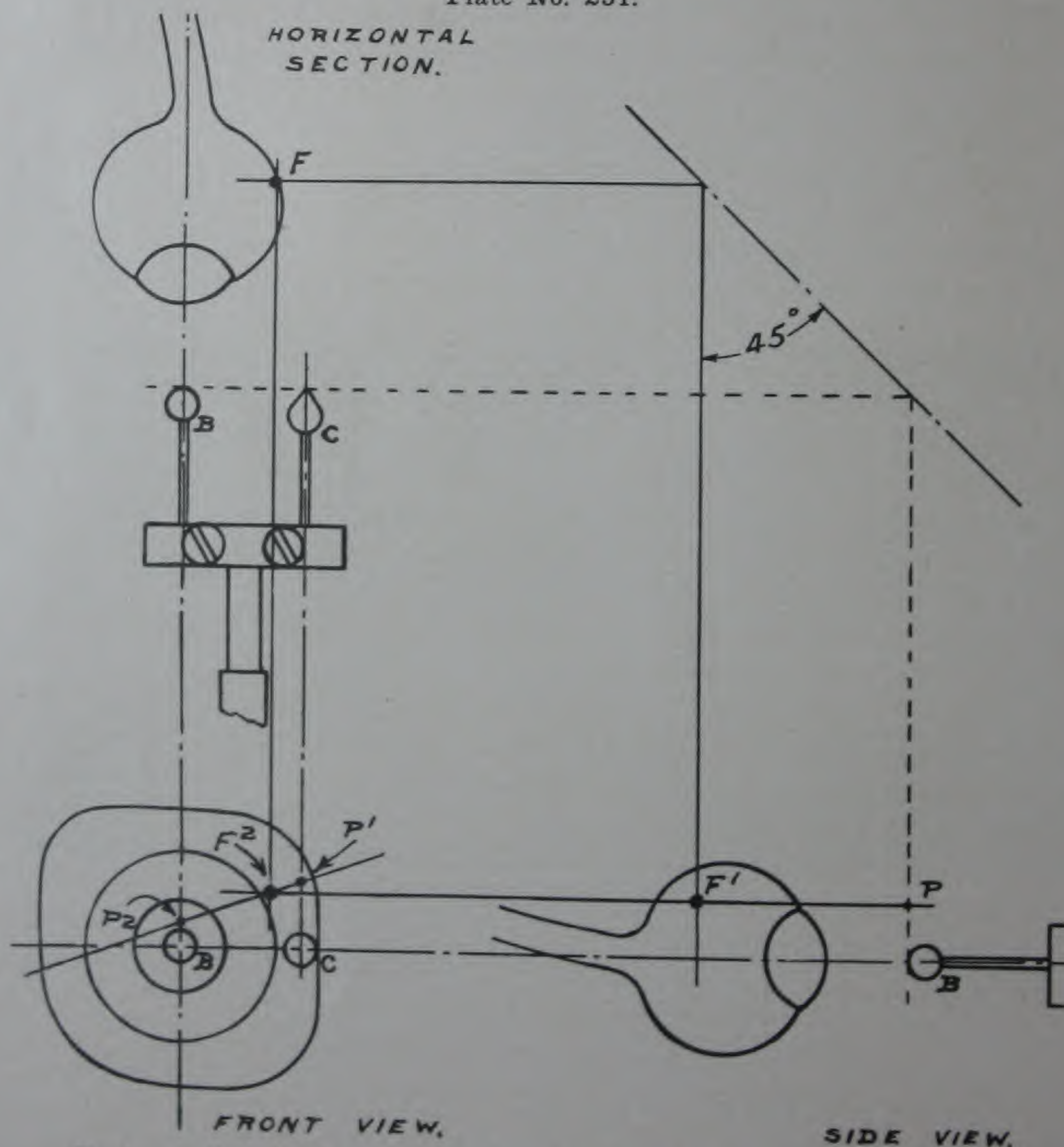
With a small pair of dividers such as draughtsmen use, step the distance from the edge of the indicator ball to the intersection of the horizontal and vertical lines that you have just drawn, then step this distance off on the diagram chart, making a dot with a pen or a very sharp hard pencil, to represent the exact distance.

On the vertical line that has been drawn through the shadow of the foreign body on Plate 250½, measure the distance of the foreign body above the horizontal line and indicate the same on the chart above the first dot, as is represented by dot F1 in Plate 251, "side view."

Place another dot on the same horizontal plane at point P and draw a line through these two dots projecting it into the "front view," as shown.

Since the position of localizer ball B, as shown on the chart, is the same as when the first picture was made, the location of the foreign object must be at point F1 "side view." But we have yet to establish its location to the nasal or temporal side.

Plate No. 251.



Project a line vertically through point F1 to the 45 degree angle, thence horizontally through "horizontal section."

Upon negative 250, which represents the second or oblique exposure, a line is drawn through the horizontal axis of both the ball and cone, thereby projecting their supporting stems and establishing the relative relation of their horizontal planes to that of the foreign body.

A third line is drawn at right angles to the first two through the center of the foreign body's shadow.

With your dividers measure the distance of the shadow of the foreign body above the horizontal plane of the shadow of the ball and mark the same by a dot on the "front view" of the chart just above the center "B," as indicated by arrow P2, because that was the relative position of the ball when it cast the shadow.

Measure the distance of the shadow of the foreign body above the horizontal plane of the shadow of the cone and mark the same on the chart at the point above "C" indicated by arrow P1, because that was the relative position of the indicator cone when it cast the shadow.

A line drawn through dots P1 and P2 will represent the true course of the rays in the second exposure and its intersection with the projected line from the "side view" through points P and F1 will be the position of the foreign body when viewed from the front, while a vertical projection of a line through this point intersecting with the projected line through "horizontal section" shows the position of the foreign body to the temporal side at point "F," horizontal section.

The reader will readily understand the first picture, lateral exposure, as shown in Plate 250½ and as charted on "side view" Plate 251, and the method of determining the position of a foreign body to the nasal or temporal side will be quite as easily understood by bearing in mind that the circles "B" and "C" on "front view" (Plate 251) represent the ball and cone of the Localizer and that the distance the shadow of the foreign body shows either above or below the plane of their shadows (as taken from Plate 250) must be represented by a dot on the vertical lines "front view" either above or below their centers, while the joining of these two dots by a straight line will indicate the ray of light passing through the foreign body the position of which will be indicated by the intersection of this line with that projected through the foreign body from the "side view."

On the next page is shown a sample chart full size, a supply of which is furnished with each instrument.

Stereoscopic pictures of foreign bodies in the eye and orbit are made with this instrument, the ball and cone of the Localizer acting as landmarks, the former indicating the center of the cornea, the latter the temporal side. The pictures are viewed through an ordinary parlor stereoscope. Such stereoscopic exposure must be made obliquely as in Plate 249, so as to show both arms of the indicator and the relation of the foreign body thereto.

In addition to the localization features of this instrument, its plate slide base can be used most successfully for a great many other purposes, among which may be mentioned stereoscopy of the frontal sinuses, the antrums, the mastoid (obliquely), the teeth and all other areas not larger than 2½x 3½ inches. With it two exposures are made upon the same plate for comparing the normal with the pathological, etc. The plate holder base, cushion and clamps will be supplied without the Localizer if so desired.

Patient _____

Right Left

Address _____

Surgeon _____

Date _____

Roentgenologist: _____

SAMPLE CHART
ACTUAL SIZE

SIZE OF BODY

by _____

LOCATION

First Exposure—Side view

MM. Above Horizontal Plane of Cornea.

MM. Below Horizontal Plane of Cornea.

Second Exposure—Horizontal Section.

MM. Temporal Side Vertical Plane
of Cornea.

MM. Nasal Side Vertical Plane
of Cornea.

MM. Back of Center of
Cornea.

HORIZONTAL
SECTION

SIDE VIEW

FRONT VIEW

FRONT VIEW

SIDE VIEW

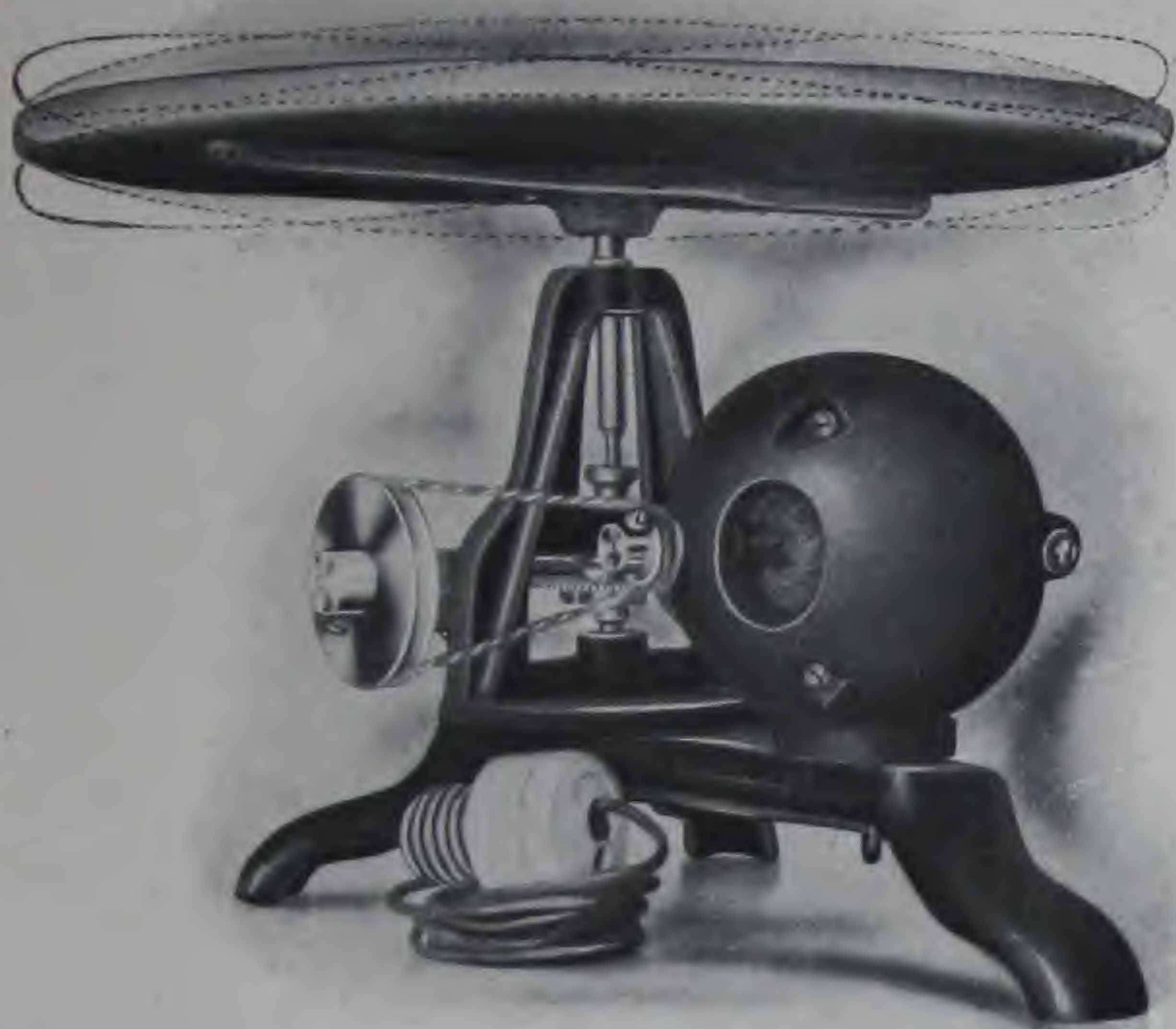
RIGHT

"KELEKET"
COVINGTON, KY.

LEFT

THE K-K DEVELOPING TITUBATOR

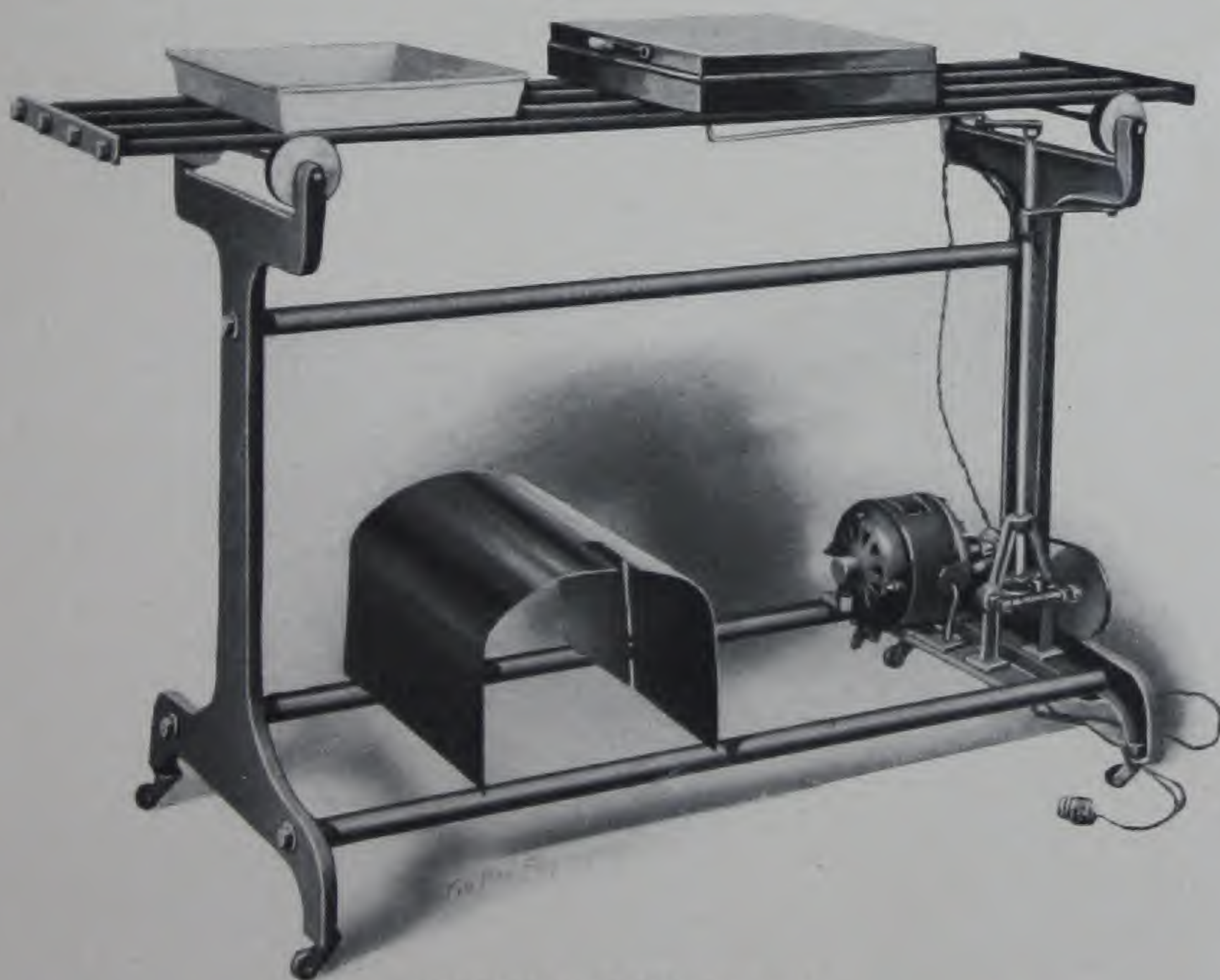
Plate No. 252.



Is an absolute necessity in every Roentgen Laboratory. All Roentgenographers have felt the need of some kind of mechanical device that would relieve them of the monotonous task of "tray shaking." The "K-K" Developing Titubator will do it. We supply one light proof tray holder for 8 x 10 plates or smaller with each instrument. When ordering be sure to mention the type of your current supply.

TITUBATOR No. 1.
Price.....\$30.00

Plate No. 253.



TITUBATOR No. 3

Titubator No. 3 has a moving shelf 44 inches long and is built very strong for developing several plates at one time. We are now supplying a much stronger motor with our titubators than formerly. When ordering be sure to mention the type of your current supply. One light proof tray holder for 8 x 10 plates or smaller goes with each instrument. Price, \$40.00.

Plate No 254.



The K-K Light-Proof, Rust-Proof Metallic Tray Holders

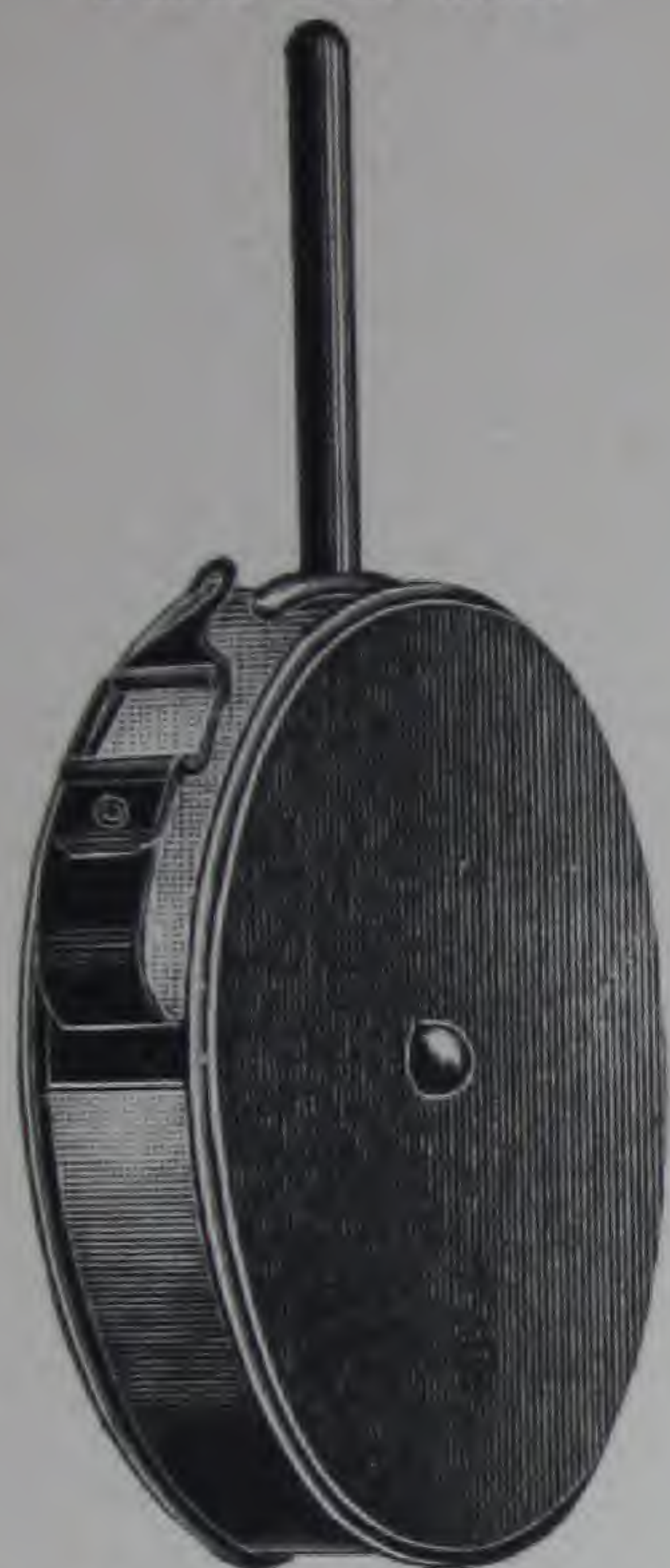
Are made in three sizes. No. 1 will take any size of tray up to 8 x 10 inches; No. 2 will take any size of tray up to 11 x 14 inches; No. 3 will take any size up to 14 x 17 inches. Being light, they are convenient to handle. We furnish one of these cases with either type of our developing titubators, which makes it possible to use the titubators outside of the dark-room. These light-proof cases are also used with much satisfaction by many operators who develop by hand. THEY ARE RUST PROOF.

For 8 x 10 plate.....	\$3.00	11 x 14.....	\$4.50
14 x 17.....	\$8.00		

Plate No. 255.



Plate No. 256.



All Metal. Self-winding tube terminals.

These terminals may be attached to any X-Ray Coil. Pressing the small button in the center of the case causes the 6-foot length of metal tape to be wound up within the case.

There can be no sagging cords in the way when these terminals are used.

Price, per pair.....\$2.25

Plate No. 258.



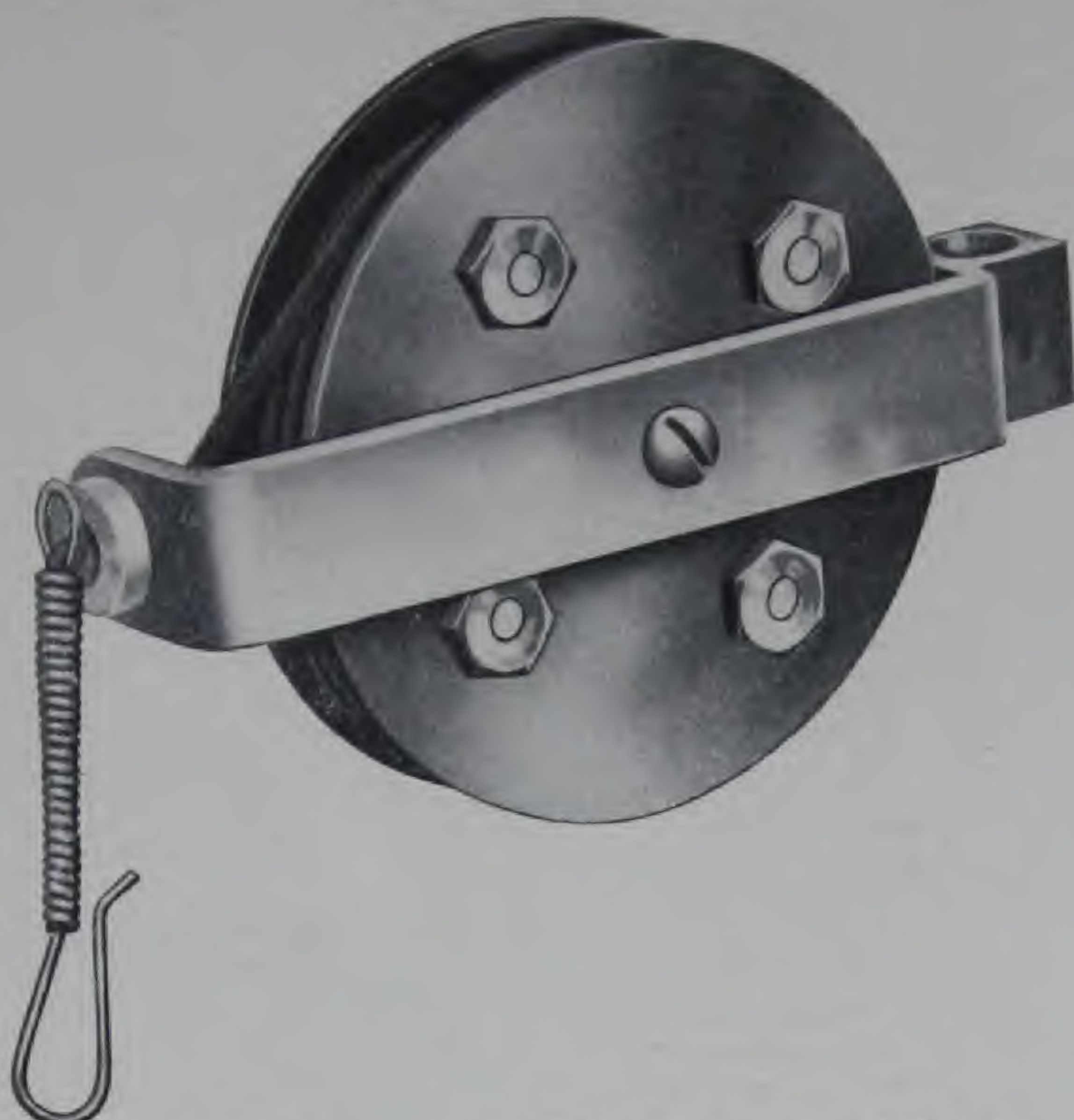
Type A. \$5.00.

THE K-K RUBY DEVELOPING LAMP

Inasmuch as X-Ray plates are more sensitive to ordinary light than other photographic plates, operators have experienced much difficulty in securing a safe ruby light, and many failures are directly traceable to this deficiency in developing equipment.

After much experimenting, we are now able to offer a lamp that is absolutely safe, and yet has sufficient illuminating power for every purpose.

Plate No. 257.

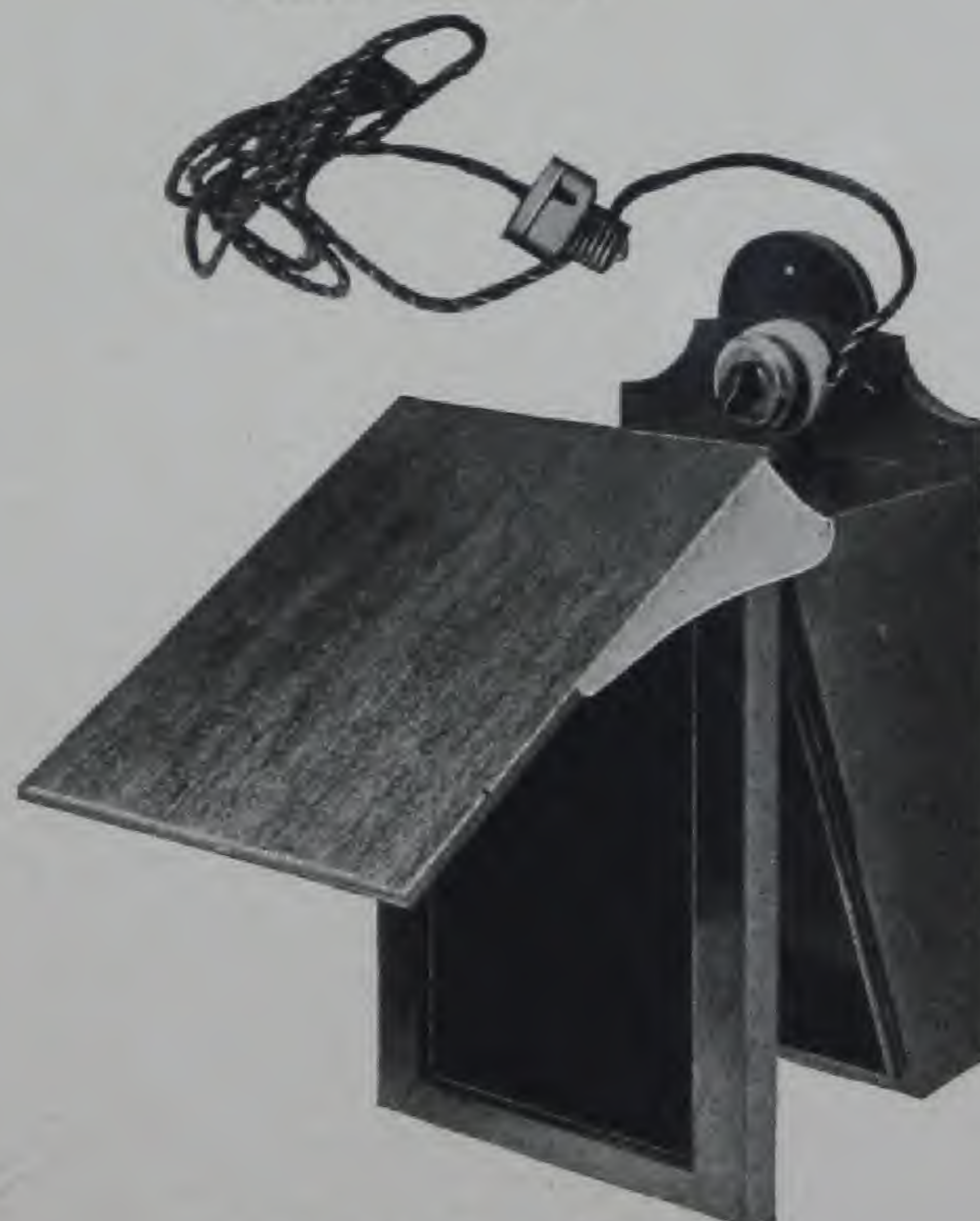


The K-K Automatic Winding Hand-Made Brass Tube Terminals.

Do not confound this instrument with the various sheet metal stamped cheap reels that are being substituted for it. Look for the word KELEKET on each reel. Terminals 8 ft. long.

Price, \$2.50 each.....\$5.00 the pair.

Plate No. 259.



Type B. \$6.00.

This lamp is the same as our Type A, except that it is equipped with an Eye Shade, which is an aid to vision without increasing the light's intensity.

**PRICES VOID
SEE SUPPLEMENT**

Plate No. 260.

**The K-K
Negative
Illuminator**

With Rheostat.



We will equip this Illuminator with our new circular multiple dimming switch (as used on our Type "E" Illuminator) without additional cost, instead of rheostat, if so specified.

Reversible, to hold plates with the long sides vertical or horizontal.

Type D, for six sizes, 5x7, 6½x8½, 8x10, 10x12, 11x14 and 14x17...\$22.50

Some valuable improvements have been made in our line of illuminators, which are not shown in these illustrations.

Plate No. 261.



**PRICES VOID
SEE SUPPLEMENT**

resistance has been cut in. The instrument is supplied with our improved circular multiple dimming switch (not shown in cut). The illuminator stands on its own base and may be moved about without the necessity of clearing a table to set it on. The entire top may be readily revolved to show pictures right side up, it matters not whether they are made cross-wise or length-wise the plate. Should the reflecting back of the Illuminator become dark from dust, a large piece of white cardboard, which can be obtained from any printer, can be placed in position and removed and replaced by a clean one at will.

It frequently happens that plates, which are so thin as to present scarcely any image by ordinary methods of illumination, will, when viewed by means of this illuminator in a darkened room, show up so well as to make them thoroughly useful for diagnosis.

Our new Type "E" Illuminator has the following advantages: It is much deeper than the other types and therefore will diffuse the light better—being larger, it does not heat up so quickly; it is made of thicker material and will not warp or crack; it is better ventilated and yet is light proof. The dimming process is accomplished by turning out lights, thereby retaining a white light. Dimming by means of a rheostat is not good because the light becomes red instead of incandescent (white) when the

Plate No. 262.



(Rear View)

REVOLVING NEGATIVE ILLUMINATOR

Will accommodate 14"x17" plates and smaller. Two 8"x10" plates can be placed in this illuminator and viewed at the same time.

Price, complete, \$30.00

Plate No. 263.

Type A—Capacity for 3
doz. 11x14 Plates.....\$ 6.00

Type B—Capacity for 3
doz. 14x17 Plates, Hos-
pital size..... 10.00

Type C—Capacity for 6
doz. 14x17 Plates..... 15.00



K-K LEAD LINED PLATE CHEST

We desire to call especial attention to the fact that it is not safe to have photographic plates near your X-Ray laboratory unless you have a leaden chest to place them in. It is also important that your exposed plates be returned to the lead chest for further protection in case they are not to be developed immediately.

Our lead lined plate chests are well and handsomely made and we have sold many hundreds of them.

Plate No. 264.



FLUOROSCOPES

The best platinum barium cyanide crystals are used on these screens and they are treated to a special coating, making them last much longer than the ordinary varieties. Each screen is detachable, and we will add lead glass coverings at an additional cost of five cents per square inch to protect the screens from dust and the operator's eyes and face from the X-Rays. Brass leaded hand shields will be added for \$1.00 each additional.

Plate No. 265.



Box Hood.

Plate No. 266.



Curtain Hood.

PRICES.

(Subject to change without notice)

Platinum Barium Cyanide Fluoroscope, 5x7.....	\$12 50
Platinum Barium Cyanide Fluoroscope, 6x8.....	16 00
Platinum Barium Cyanide Fluoroscope, 8x10.....	24 00
Screens only, price per square inch.....	25
Unmounted Tungstate of Calcium Screens, per square inch.....	15

These goods are our own product and operators who use screens extensively will appreciate the improvement over the ordinary stock article.

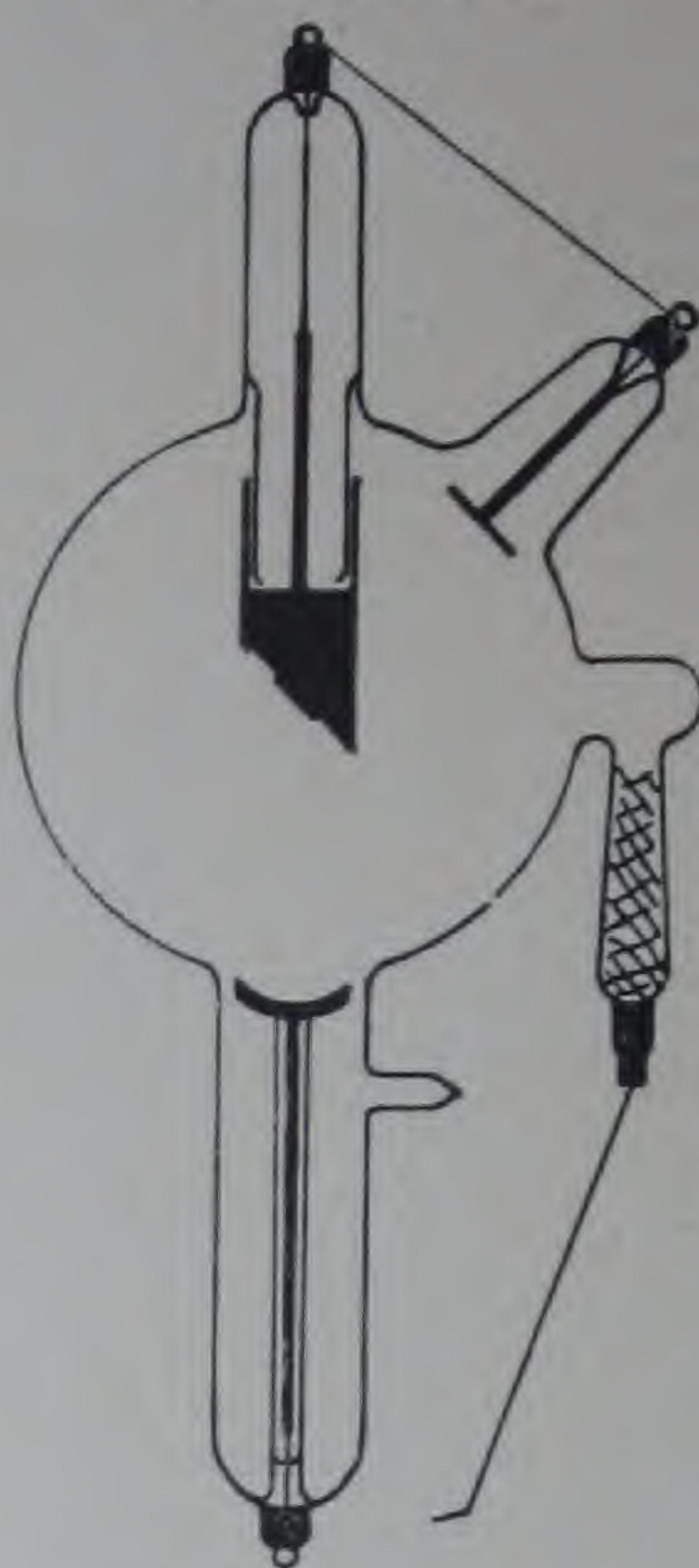
Plate No. 267.



G. & B. TANTALUM
ANODE

6" Globe.....	\$20 00
7" Globe.....	25 00
8" Globe.....	30 00

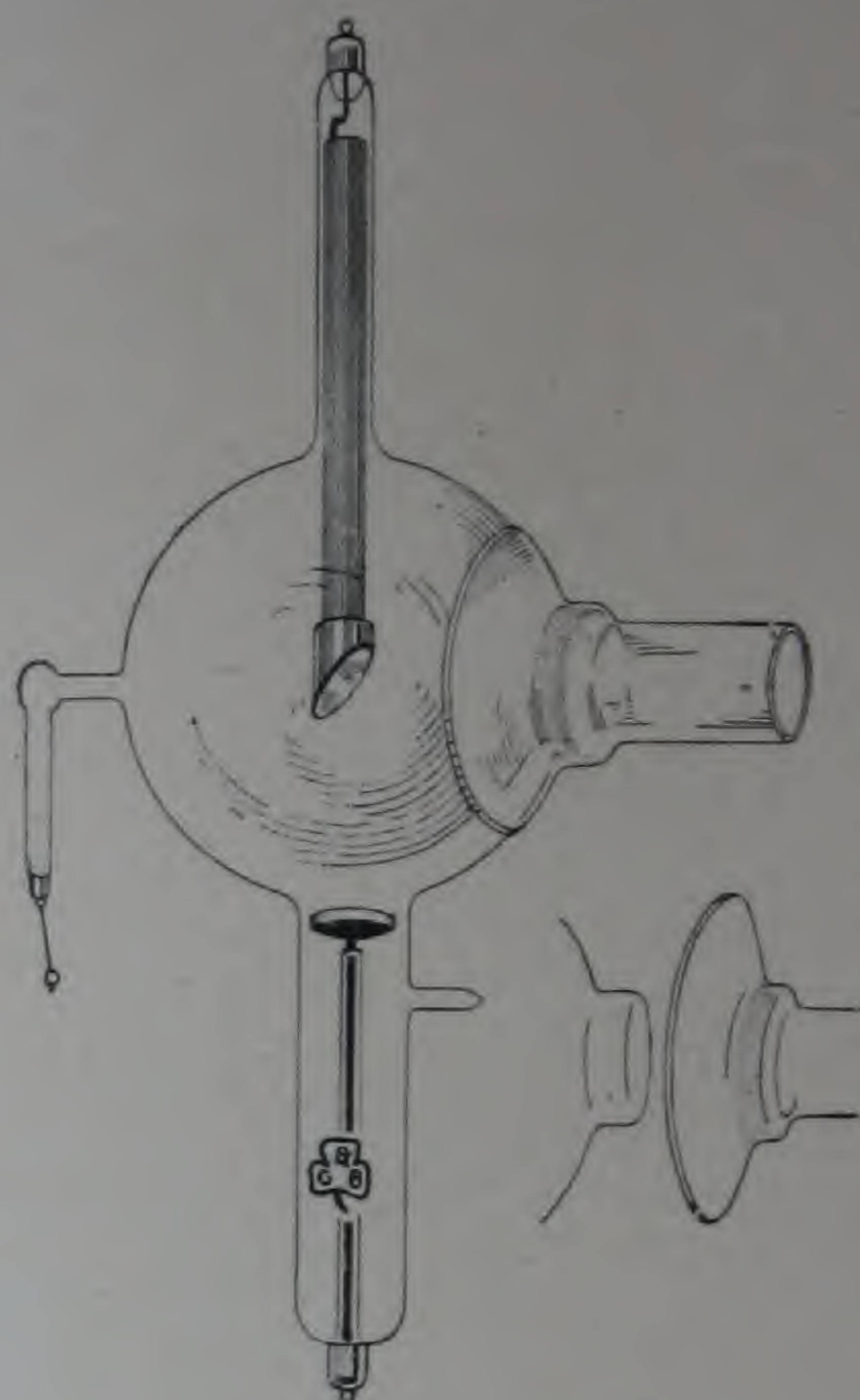
Plate No. 268.



M. & W. PLAT. ANODE

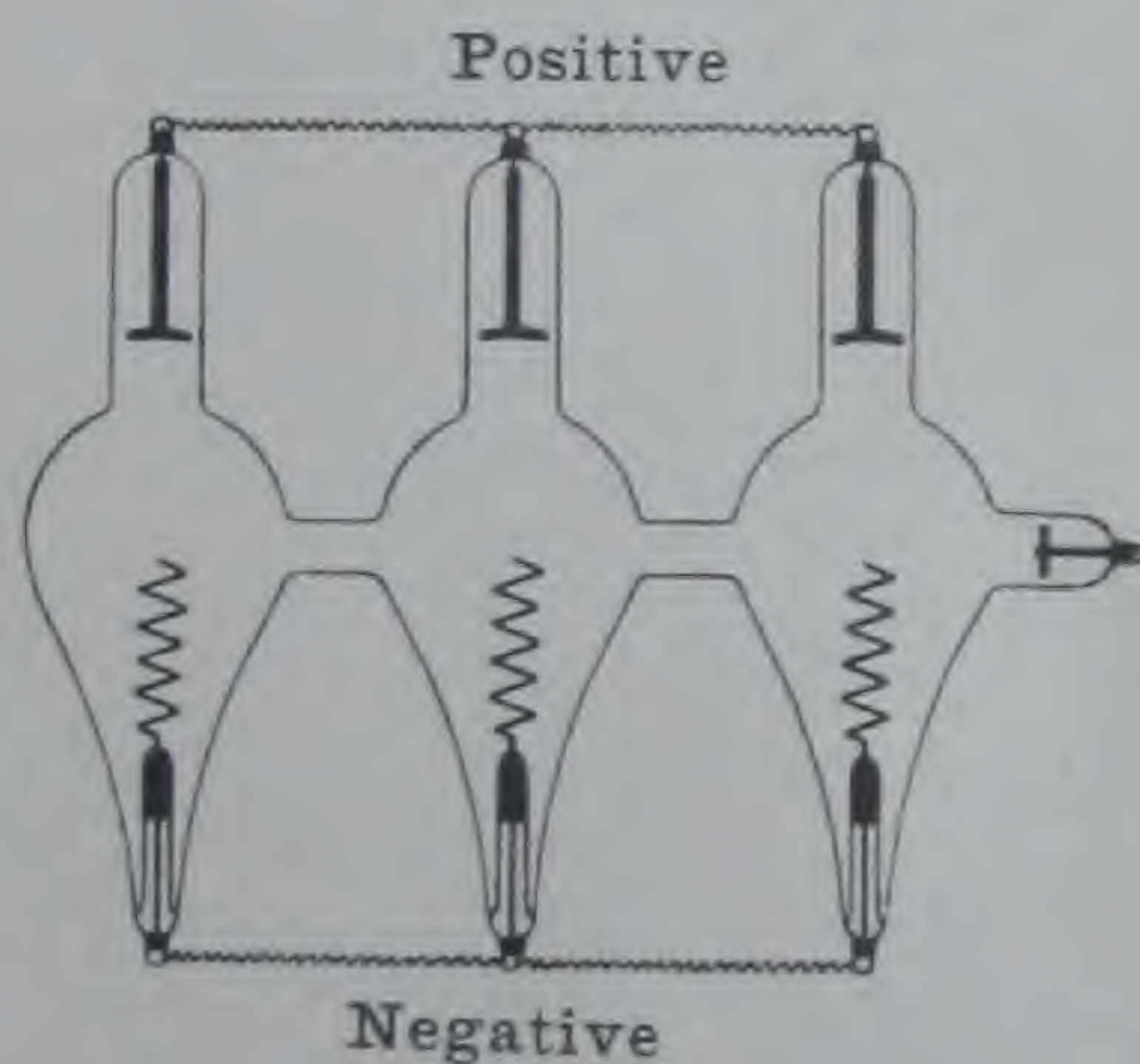
6" Globe.....	\$25 00
7" Globe.....	30 00
8" Globe.....	35 00

Plate No. 269.



G. & B. LEAD GLASS
Treatment Tube
6" Globe.....\$20 00

Plate No. 270.



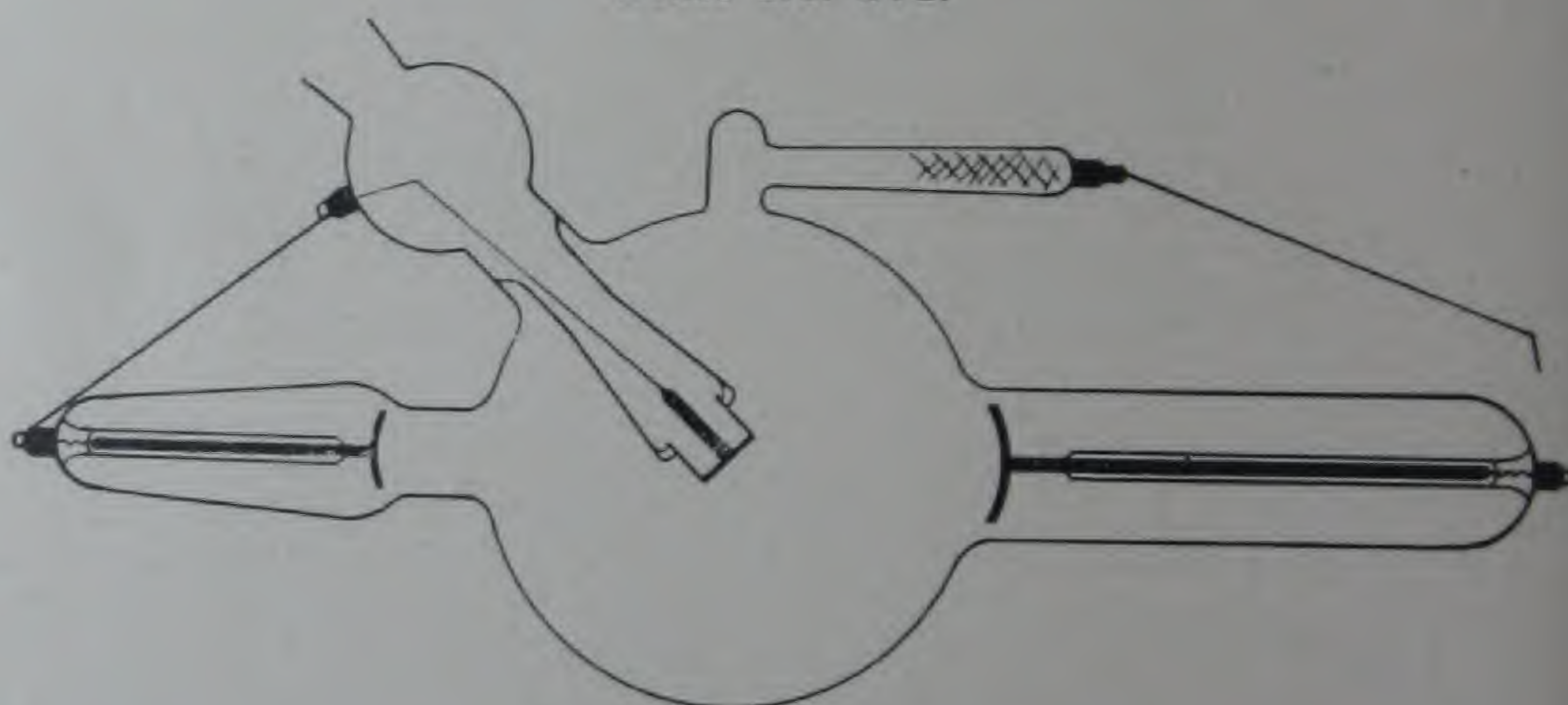
VALVE TUBE OR HIGH
TENSION RECTIFIER.

Single Valve.....	\$15 00
Double Valve.....	22 00
Triple Valve.....	30 00

Our Multiple Valve Tubes are most effective for picture making, because of their low positive resistance.

Single Valve Tubes can not be used successfully for quick picture work because they will not pass sufficient amperage and separate tubes are not effective when used in parallel because their vacuums cannot be regulated uniformly.

Plate No. 271.



G. & B. WATER COOLED

6" Globe.....	\$32 00
7" Globe.....	37 00
8" Globe.....	42 00

Plate No. 272.

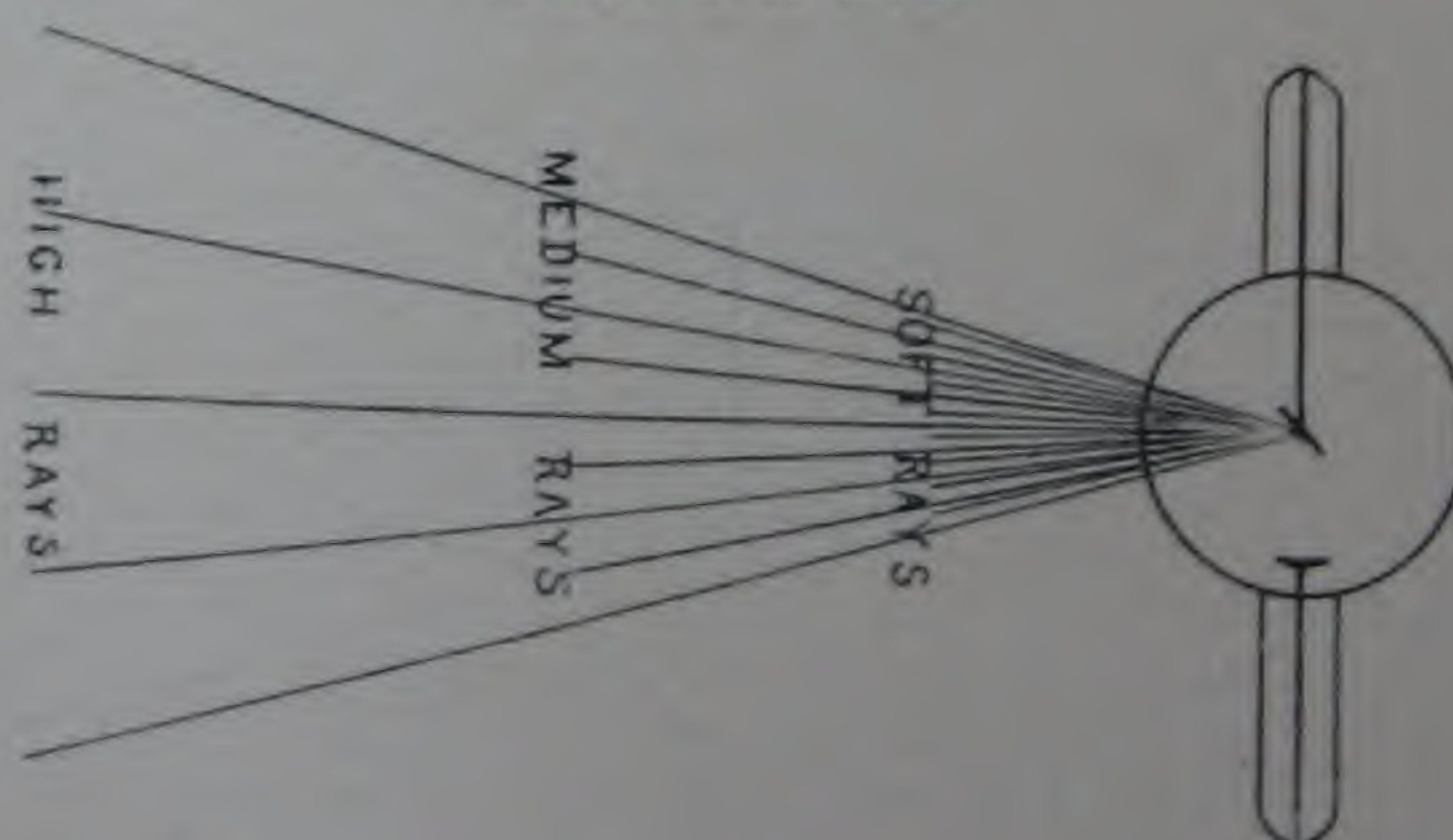


Plate No. 273.



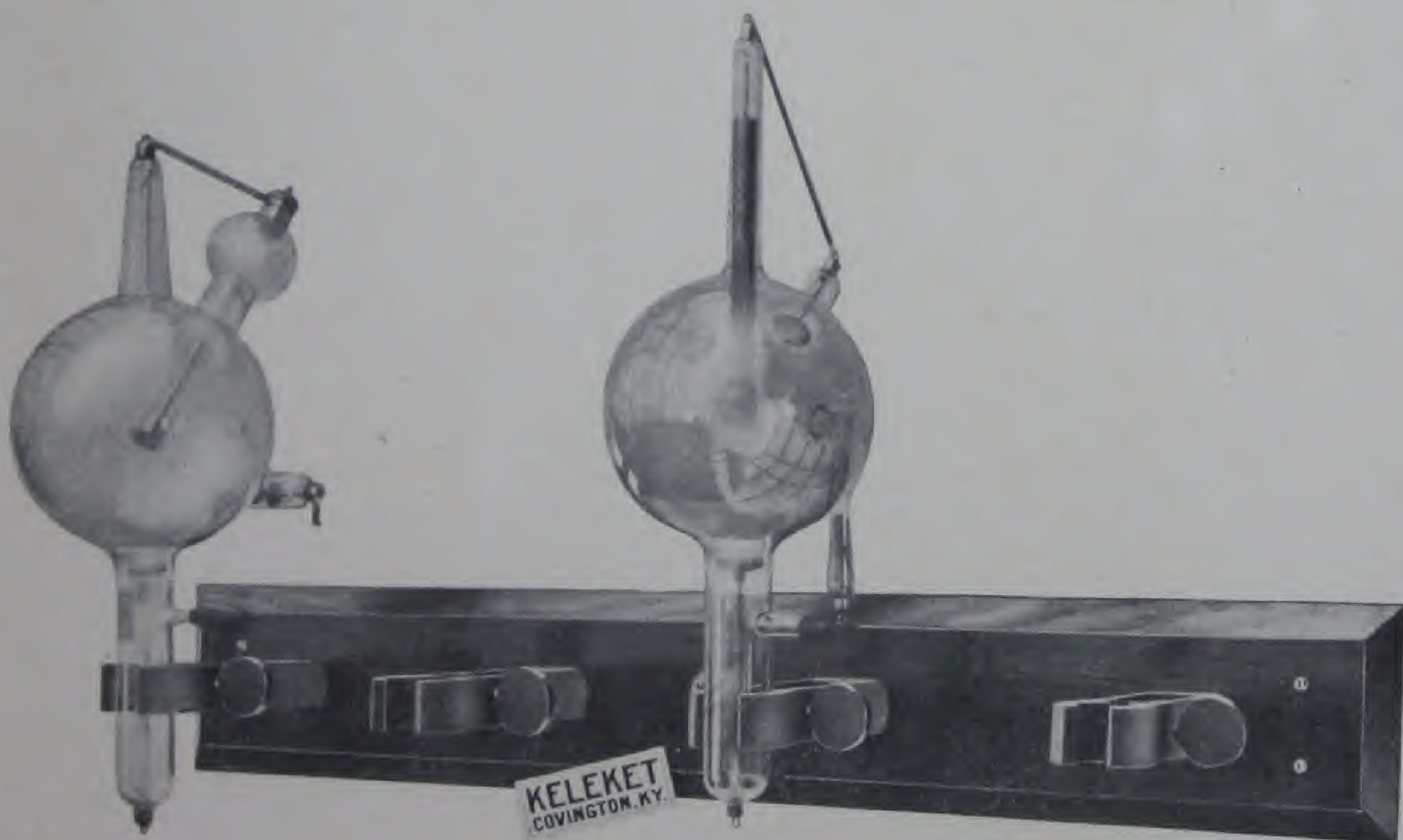
TUBE RACKS

Quartered Oak Base, Rubber Protected, Metallic Brackets.

Price, \$1.00 each.

All tubes of high vacuum retain a considerable charge of electricity after the current has been turned off, and it is therefore a good practice to touch two of their terminals simultaneously before laying the tube away, otherwise it may puncture by coming in contact with some metallic or other cold conductor.

Plate No. 274.

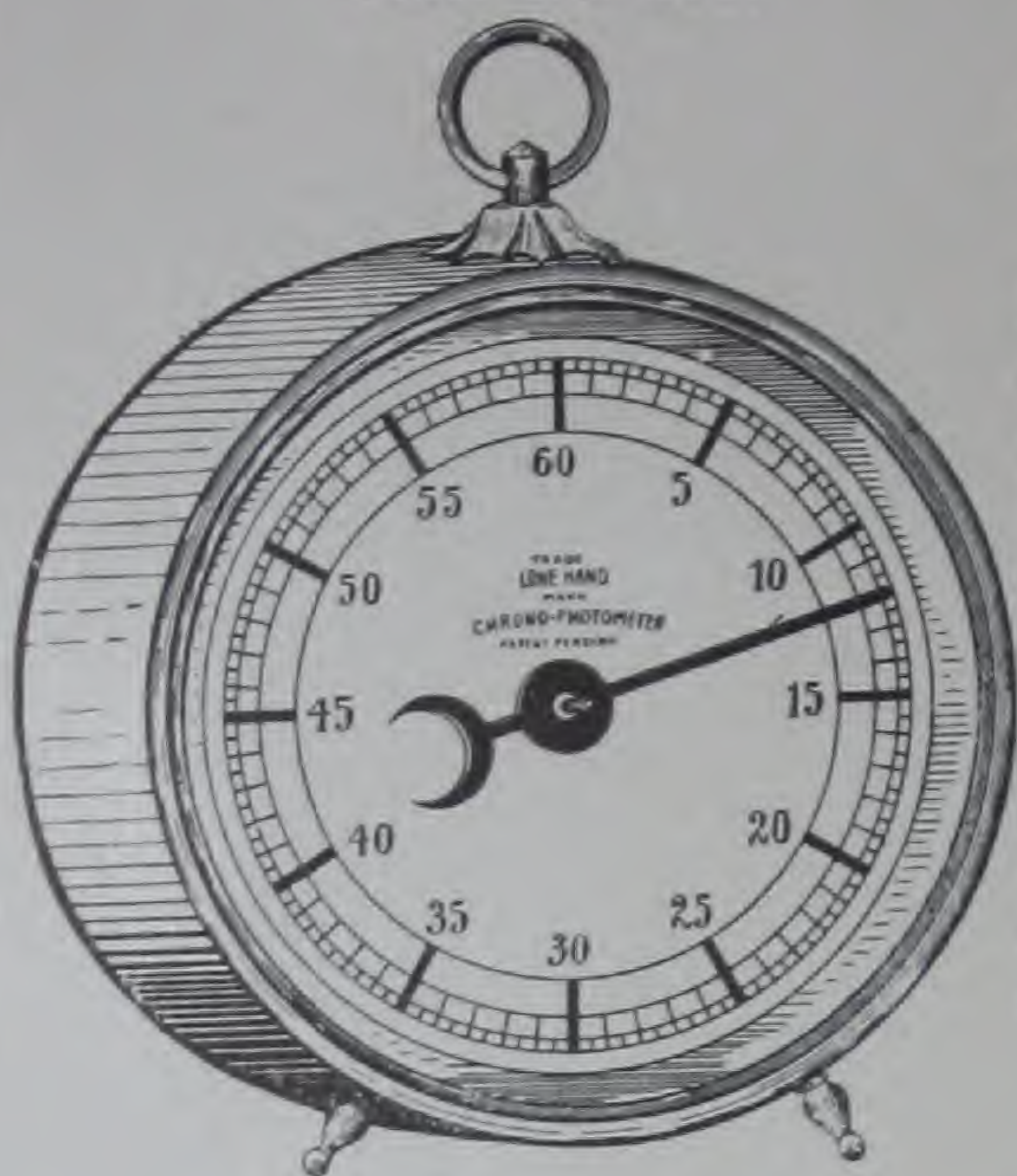


THE K-K-CLAMP TUBE RACK

Prevents the tube's bulb from coming in contact with any conductor or hard or cold substance, and should be used exclusively, as the loss of a single tube will equal the cost of several such racks.

Price, for four tubes.....\$5.00

Plate No. 275.

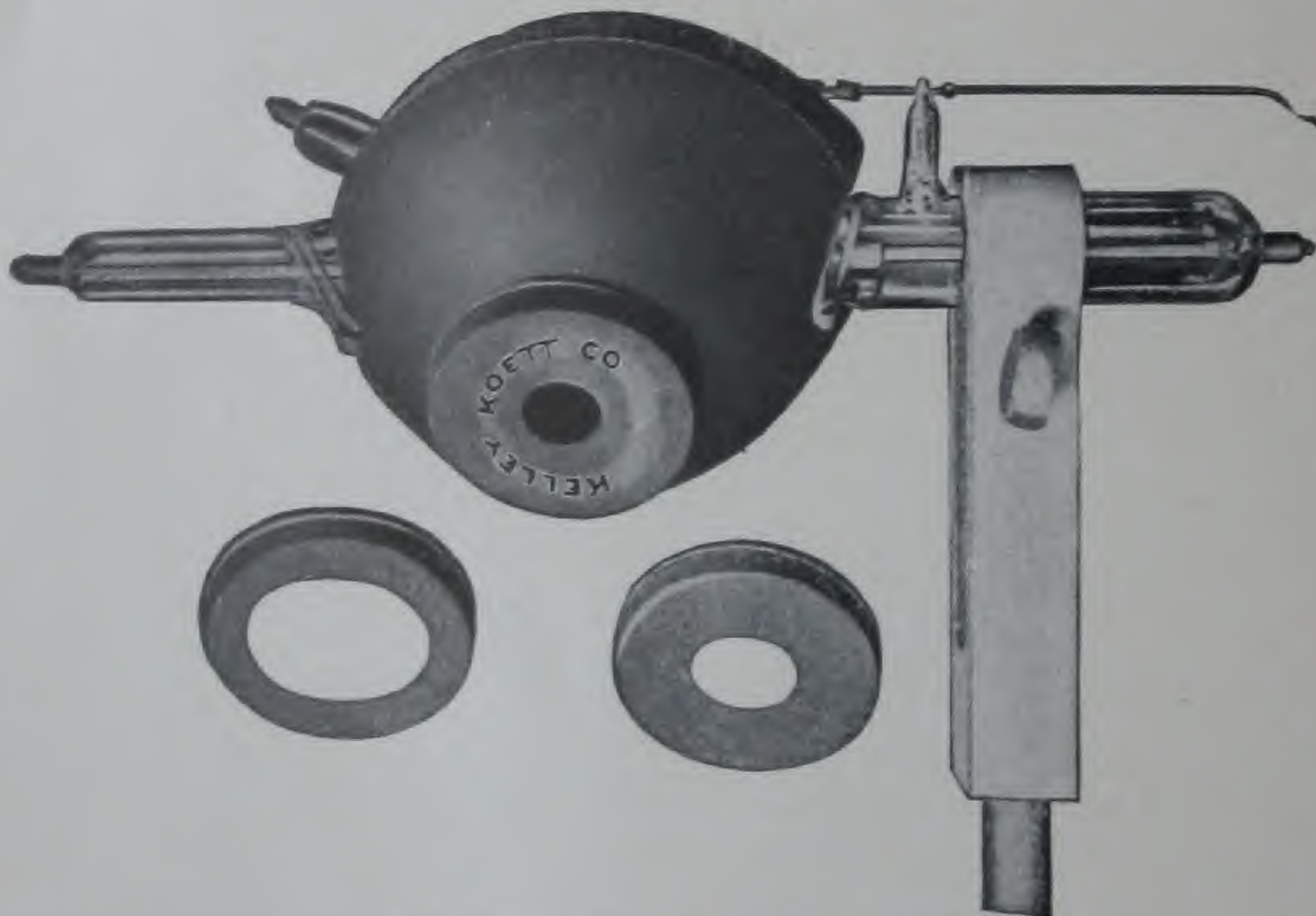


The Chrono-Photometer

A most convenient Split-Second Clock for timing X-Ray exposures. The dial is four inches in diameter and the indicating hand makes the complete circuit in sixty seconds. You ought to have one to be able to more accurately time your exposures.

Price, \$3.00

Plate No. 276.



PROTECTION SHIELD

For 6 inch Tubes

Price \$8.00

Plate No. 277.



OPAQUE GLOVES

Price, \$6.50 per pair

Plate No. 278.



The K-K Oscillimeter

A polarity indicator for high-tension currents, and being a detector of inverse, is invaluable as an indicator of the true working condition of an inclosed X-Ray tube.

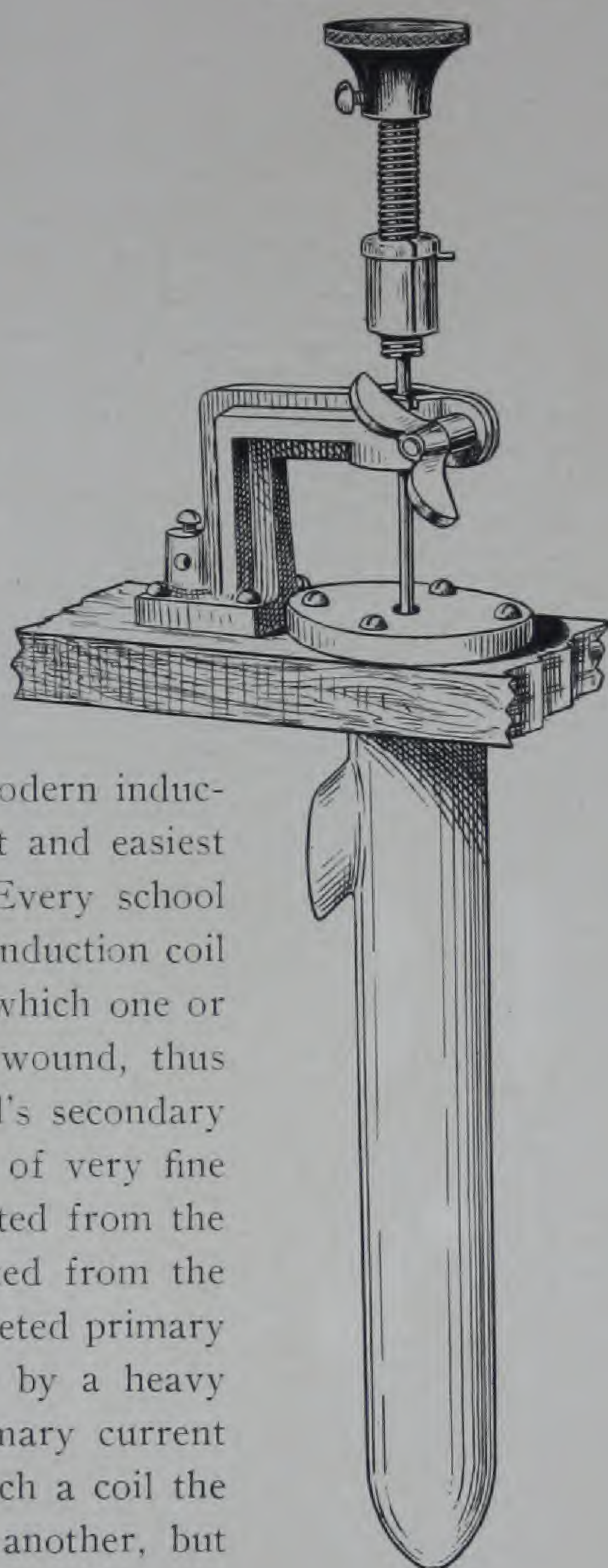
Price, \$3.00 each.

THE KELEKET

Water Cooled Multiple Electrolytic Interrupters

PRICES.

One-Point Interrupter.....	\$30 00
Two-Point Interrupter.....	40 00
Three-Point Interrupter.....	50 00
Five-Point Interrupter.....	70 00
Seven-Point Interrupter.....	90 00



The construction and manipulation of a modern induction coil for X-Ray work is about the simplest and easiest thing to understand that can be imagined. Every school boy knows how induction coils are made. An induction coil consists of a bundle of soft iron wire around which one or more layers of heavy copper wire has been wound, thus forming the coil's core and primary. The coil's secondary winding consists of a great number of layers of very fine copper wire, each layer of which is well insulated from the one beneath it and each turn carefully insulated from the other turns on either side of it while the completed primary and secondary are insulated from each other by a heavy micanite cylinder. Should an interrupted primary current be passed through the primary windings of such a coil the resultant magnetic lines of force will cause another, but greatly modified current to be available from the coil's secondary terminals.

To be able to successfully construct an induction coil for X-Ray work, one must not only have a good knowledge of electricity, induction and insulation, but he must know how to construct an instrument that will successfully make and break a primary current of little or great volume at any rate of speed that may be required. That we have accomplished this end in our Multiple Interrupter is well proven by the great number that are in successful operation throughout the world. This instrument serves a two-fold purpose; it not only interrupts the primary current passing through the induction coil, but it also restricts the quantity (Amperage), thereby greatly simplifying the technique for picture making. With your coil's main rheostat you can modify the voltage (pressure), while with our Multiple Interrupter the amperage can be restricted to any desired amount within the capacity of your coil and current supply.

Plate No. 280.



(PATENTED)

Each individual point of our Multiple Interrupter, when tested single, should be set to pass its portion of the maximum capacity of the instrument when all points are used at once. For example, when the seven-point instrument is used and it is desired to pass a maximum of thirty-five amperes, each point must be set for five amperes when used alone, so that ten amperes will pass when two points are used, twenty for four points, etc., (rheostat to strongest point.)

You have doubtless observed that when using a Wehnelt interrupter having one very short, small platinum point, you get a beautiful light in your X-Ray tube, but it is not strong enough and turning the rheostat to its strongest point does not make it much better, because the current quantity is restricted by the limited exposed surface of the platinum point in the interrupter and while turning the rheostat stronger does increase the current pressure (voltage) it can not materially increase the quantity (amperage) unless the exposed surface of the interrupter's platinum point be also increased.

The usual method of increasing the capacity of such an interrupter is to make the point longer, but that is not desirable because in so doing the interruptions will be coarser and much less effective. The Grosse Flamme way of doing it is to use additional small short points in parallel so as to

pass the desired amperage without modifying the rapidity of interruptions or changing the current potential.

This method has greatly simplified the technique for picture-making and it is now possible for a novice to make as good pictures as an expert can do, as it is only necessary for him to have sufficient experience to properly judge the quality of the tube vacuum. For example, if today we make an adult hip in ten seconds—rheostat at strongest point, No. 4 inductance, five points of interrupter, six-inch tube, we can do it again tomorrow by simply following the same formula. If today we used a tube for five minutes without over-heating it, in making a fluoroscopic examination, by using No. 3 inductance rheostat two-thirds on, two points of interrupter we can do the same again by the same formula. Thus it will be seen that by the use of this interrupter results can be duplicated at will and the instrument will last longer because the load (current break) is divided between a number of widely separated points.

This instrument can be used successfully with either the direct or alternating current, it will work well with any good induction coil, and by our simple technique which this interrupter will enable you to employ, the speed and efficiency of your Roentgen outfit will be greatly improved.

The chemical break is without question the best form of interrupter that can be devised for picture making, and our multiple point instrument is superior to any other, because by its use you can increase your coil's primary amperage to its utmost capacity without diminishing the frequency of interruption or lowering the current potential.

Our Multiple Point Interrupter is water cooled and has tubular iridio-platinum anodes of extra length, which insure a perpetual blunt surface, enabling the instrument to produce a sharp, clean cut interruption every time and continuously the same as when new. One point has quick lever adjustment for treatments and general work, all others have fine screw adjustments and may be used singly or as many as may be desired in parallel to pass the desired amount of amperage. Each point can be readily withdrawn for inspection and replaced without disturbing its adjustment.

The advent of this interrupter is of untold value to Roentgen operators, because by its use instantaneous skiagraphy of the chest has been made possible, results can be duplicated at will, tubes will last longer and the technique for the most difficult work has been greatly simplified. Write us today and let us help you to accomplish better results in your Roentgen laboratory. The outer case of these interrupters are oak, substantially lined with sheet lead. The electrolyte receptacle is a heavy glass globe of two gallon capacity. The space between the glass globe and leaded box should be partially filled with water.

CONNECTIONS.—These multiple interrupters have two binding posts for series connection with an X-Ray coil. The positive wire from mains should connect with the binding post on interrupter marked + (positive). The other binding post on interrupter marked — (negative) should connect with rheostat, then to X-Ray coil and back to the negative side of the main line of current supply. If you wish to use the interrupter from the alternating current with a single cell rectifier, one wire from the A. C. mains should connect with the carbon element of the rectifier, the aluminum element of which must connect with binding post of interrupter marked + (positive).

TO OPERATE.—If one switch only of interrupter be closed, one point only will be in use; to pass more current, close additional interrupter switches, but the rheostat must be turned on *strong* to overcome the increased resistance.

ADJUSTMENT OF POINTS.—The screw controlled interrupter points should be uniformly adjusted so that when all are used at once the maximum amperage desired will pass; for example, if you have six screw controlled points and you wish a maximum of forty-two amperes, you should set each point so that when used single with coil inductance No. 4, rheostat to strongest point, four inch main spark gap, your ampere meter will show seven amperes, three points, twenty-one amperes; six points, forty-two amperes, etc. After being correctly adjusted the screw controlled points should never be adjusted upwards, because the exposed portion of the platinum becomes thinner with constant use, and when drawn upwards into their porcelain sleeves, they no longer fit snugly, thereby allowing interruptions to take place internally, which destroys the efficiency of the instrument by wearing the porcelain insulator funnel-shaped.

THE LEVER CONTROLLED POINT.—When it is desired to modify the frequency of interruptions by varying the length of an interrupter point, always use the lever controlled point alone, by closing the middle switch of the interrupter, leaving all other interrupter switches open, as by so doing you will preserve the screw controlled points in perfect condition for your quick and more difficult skiographic work.

NUMBER OF POINTS.—We are frequently asked if a five-point interrupter will not fill all requirements as well as one having seven points. If so by the same manner of reckoning a three-point instrument would be as good as the five-point and so on down to one point. Just bear in mind that the shorter and smaller the point the faster and finer will be the interruptions, and in turn your coil will be higher in efficiency, quicker in skiographic results, more nearly noiseless and less hard on tubes; but the shorter and smaller you make the points the more of them you must use in parallel to pass sufficient amperage.

LEVER OMITTED.—To enable operators to use all points of their interrupter at once, we are frequently called upon to substitute an additional screw-controlled point for the one controlled by the lever, then all points are uniformly adjusted to the same length and used single or twos or threes (alternately to distribute the wear) for therapeutic, high frequency and fluoroscopic work, so that all of them can be used at once for quick picture making. This does not modify the price.

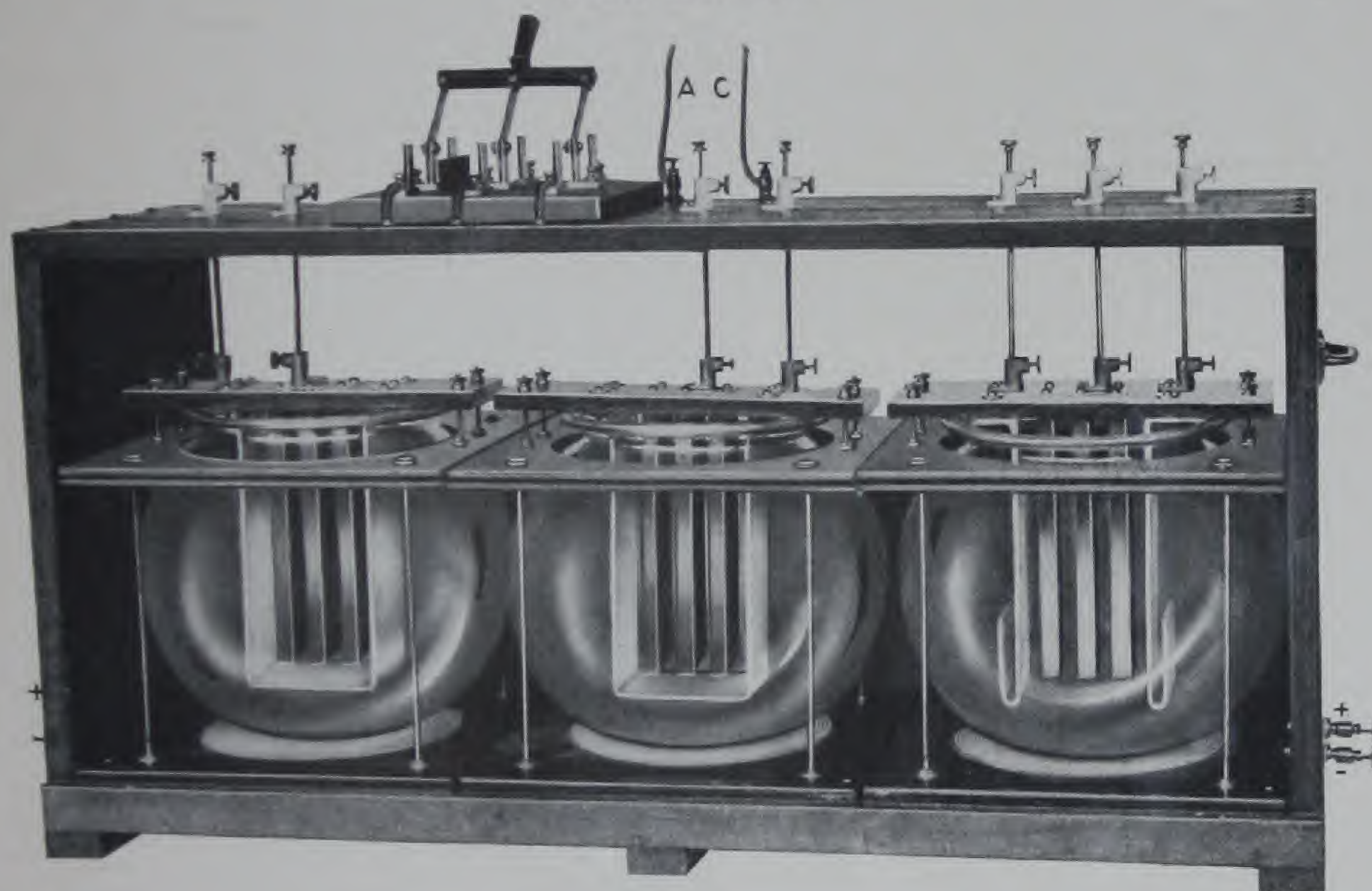
SEALED IN PLATINUM POINTS.—The most perfect results can be obtained from chemical interrupters, the platinum points of which are sealed (welded) into their porcelain insulators and such interrupters are also more durable than the adjustable type because the acid electrolyte can not reach the interior of the porcelain tube, thereby destroying the base metal to which the platinum attaches. Sealed in platinum points can never become detached. This method of construction also eliminates any tendency of "sticking" (intermittent effect), which sometimes occur with unsealed points. We recommend the sealed in platinum points for five and seven-point instruments, one point of which may be adjustable by lever if so desired; however, if all the points are sealed in and of uniform length and if you have from five to seven of

them, each point can be furnished quite short, so that any desired variation of current strength can be had from the weakest to the full capacity of your coil and current supply, by closing but one or as many interrupter switches as may be required, using the coil's rheostat for fine, intermediate adjustment.

We supply interrupters with "sealed in" platinum points at the same prices as the adjustable type.

CAUTION.—Do not be mislead into buying imperfect, ineffective, imitations of KELEKET Interrupters; ask for copies of our patent papers and see for yourself why you can get the genuine from us only. We have additional patents pending. Look up our former catalogs and you will see that we are always about three years in advance of other makers.

Plate No. 281.



(PATENT NO. 887,096)

THE K-K MULTIPLE CELL RECTIFIER

F. P. Design Complete as Illustrated, \$50.00.

Single Cells, \$15.00 Each

Complete with chemicals

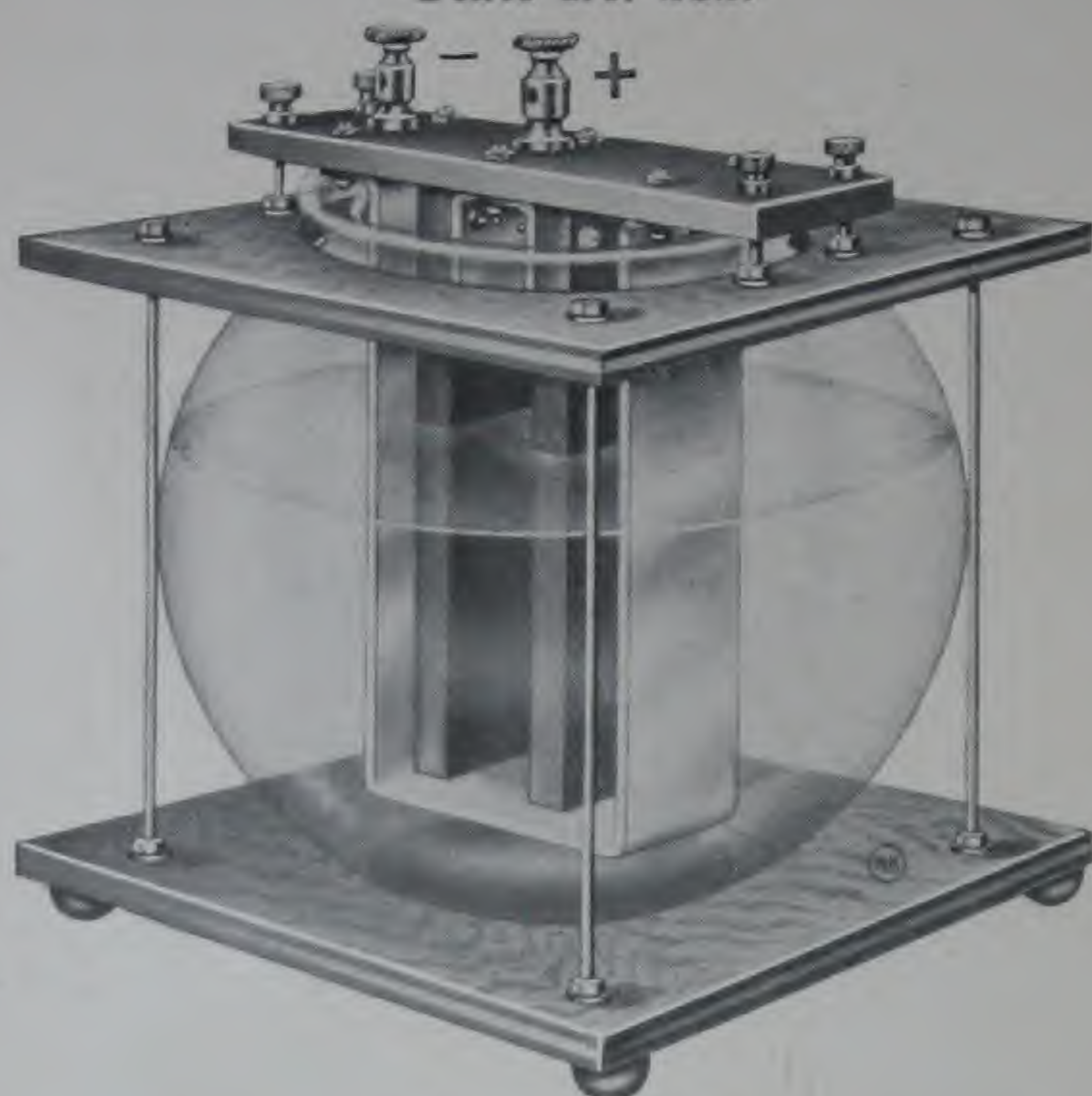
This instrument truly rectifies both sinewaves of an alternating current of any frequency and by its use X-Ray coils can be used with perfect satisfaction from the alternating electric lighting system.

By referring to our illustration you will observe that we have so designed this instrument that we are enabled to do all the wiring here at the factory, so that a mistake in connecting the cells can not be made. Simply place the three glass containers in position in the frame as illustrated, the binding posts on the rectifiers will be directly beneath those on the frame, seven inches above them, drop the seven vertical copper rods through these binding posts, tighten the thumb nuts and the cell connections will be complete. It is not possible to make a mistake because the connecting rods will not fit in any except the correct way, that is why we designate this combination as our F. P. Design.

We invite especial attention to the fact that the cells of this rectifier are

not inclosed, but are in plain view of the operator, so that their action while in use can be observed. The air can circulate around them, and water can be added to make up for evaporation without removing them from the frame.

Plate No. 282.



(Patent No 887096)

This is a great improvement over all other existing forms of rectifiers and it will be amusing to see other makers follow suit when they have seen this illustration.

You will readily observe the practicability of this form of rectifier any cell of which can be removed without disturbing the other cells, while any one set of elements can be taken out without having to disconnect the entire set.

Heretofore the one great trouble with multiple cell rectifiers has been that, when

not used for several days, the main fuse would likely "blow" when first started on account of a partial short circuit due to the deterioration of the film substance on their cathode elements, which requires several seconds in use to form. This difficulty has been fully overcome in our F. P. Type of Rectifier.

Full directions for installing and operating accompanies each instrument. The chemicals for these rectifiers are inexpensive and can be purchased from any dealer in drugs. We supply chemicals for the first charge, which should last from six to twelve months. Water should be added to each cell occasionally to make up for evaporation, as the internal resistance of the instrument will be lowest when the elements are as nearly emersed as is practical.

Provisions have been made for taking the direct current off at either end of the cabinet to best suit your convenience, two or more X-Ray coils can be permanently connected and operated from one set of rectifiers, which can also be used for operating giant magnets, d. c. motors, etc.

Another very important feature of our F. P. Rectifier is that its internal resistance is low, due to the fact that by overcoming any possibility of partial short circuit on starting (fuse blowing) richer electrolyte can be used with it, and it works perfectly with three cells instead of four, as used by all other firms who have adopted our former design as being ideal.

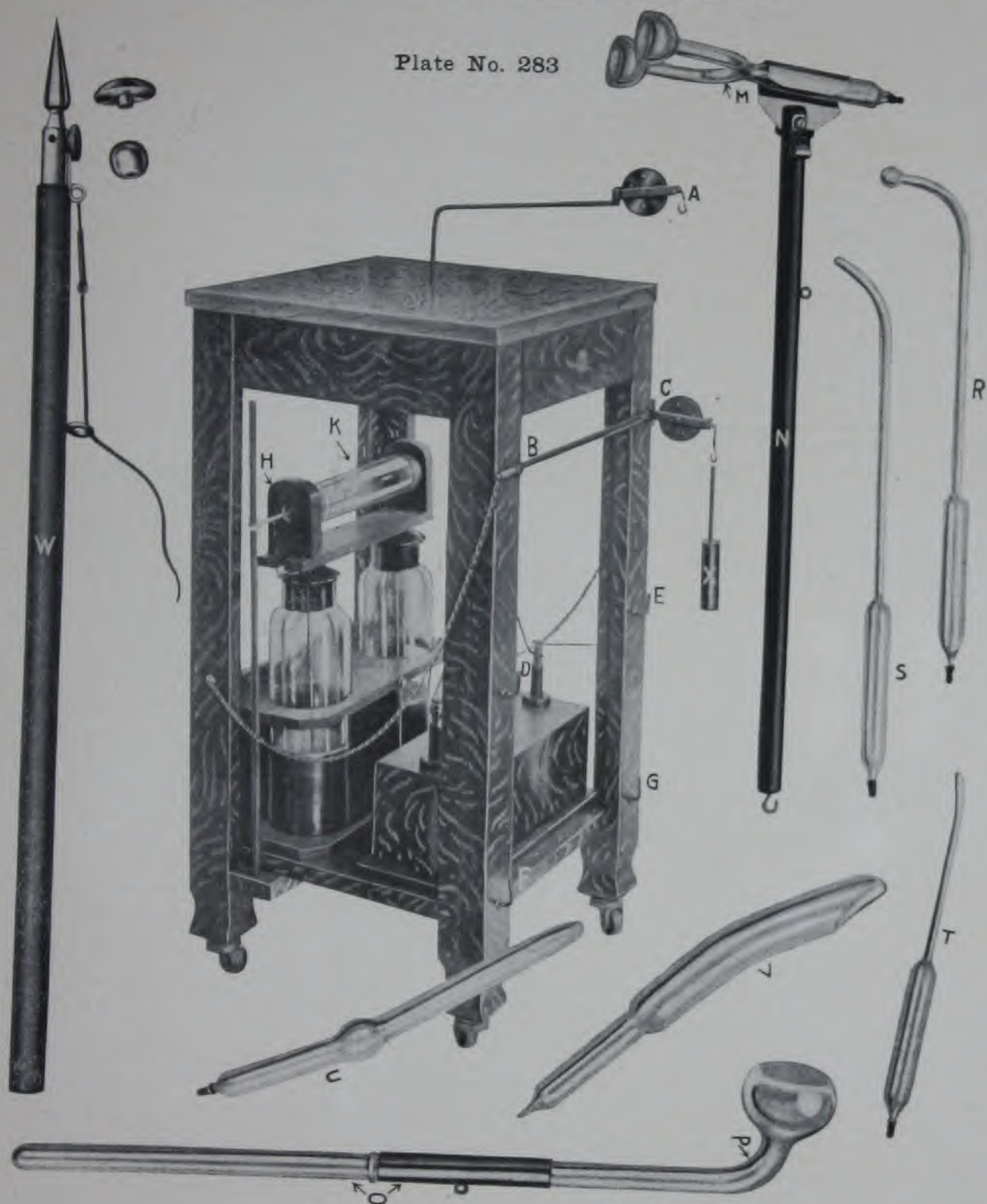
These rectifiers are designed to be operated from mains of 110 volt pressure and it has been well proven that no electrolytic valve will operate economically at a greater pressure than 130 volts. We are, however, pleased to state that we are in a position to supply F. P. Rectifying sets of highest efficiency for handling any voltage of alternating current delivering to the X-Ray coil a direct (rectified) current of any pressure from 200 volts down.

Write us your requirements and receive our specifications with quotations.

THE K-K IMPROVED HIGH FREQUENCY COMBINATION Resonator and Hyperstatic Transformer Combined.

This Instrument can be used in conjunction with any good coil.

Plate No. 283



RESONATOR READY FOR WORK.

- "A" Oudin Effleuve Unipolar.
- "B-C" D'Arsonval Unipolar or Bipolar.
- "D-E" Hyperstatic—Tesla High Frequency.
- "F-G" Currents for Auto-Condensation.

The effleuve from this resonator is nearly as large as the top of its cabinet, and the other currents are proportionately efficient.

Complete instrument as illustrated.....	\$60 00
Set 6 Vacuum Electrodes, P, U, V, T, S and R.....	5 00
Eye Electrode with handle (M N).....	1 50
Metal Electro handle with three tips (W).....	1 50
Chair Auto-Condensation Cushion (Plate 123).....	10 00
Couch Auto-Condensation Cushion (Plate 124).....	25 00

Plate No. 284.



Chair Cushion, Price \$10.00.

Plate No. 285.



Couch Cushion 72" long, 24" wide, Price \$25.00

THE K-K RESONATOR AND HIGH FREQUENCY COMBINATION

This appliance when connected with our coil, puts under the physician's hand most every kind of electric current, wave, effleuve, auto-condensation charge and vacuum electrode pulse, that the most recent practice makes use of.

The elusive electricity, still so mysterious and incomprehensible, is here made manifest, for beneficial purposes, in various forms and functions, that make the operator seem a magician.

The value of rapidly oscillating high tension currents is now being recognized by leaders in the medical profession, and whether or not the results being obtained are due to spectacular phenomena, psychological delusion or true curative properties is a matter of but slight concern to the manufacturer, and we are therefore content when we have produced an instrument capable of supplying the various forms of therapeutic currents with such perfect convenience to the operator.

Our resonators are very compactly arranged, and when not in use can be utilized as an ordinary center table.



THE K-K PROTECTIVE SCREEN

Type A—With American Plate Glass.....	\$22.00
Type B—With Imported German Lead Glass.....	27.00

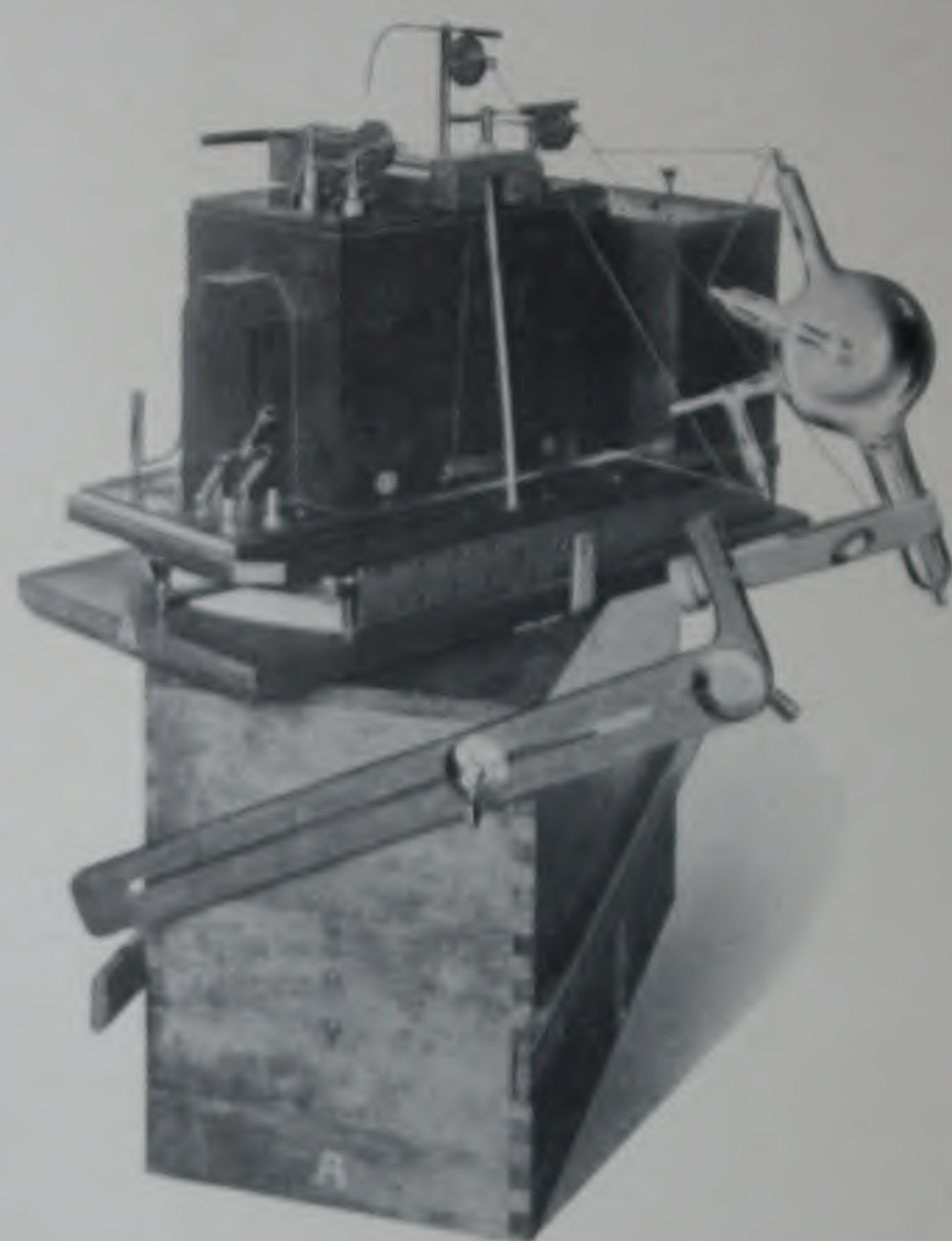
We are now fitting all our screens with 10"x12" windows and the tops are double paneled, a very pleasing effect not shown in cut.

Quartered oak; 31 inches wide, 72 inches high; the lower panels are made of heavy sheet-lead; the window at top is quarter-inch glass; mounted on heavy casters for ease in handling.

It is claimed by many well-known scientific men that prolonged and oft-repeated exposure to the Roentgen rays will result in sexual sterility; other deleterious effects of continued exposure (dermatitis, etc.) are too well known to require mention. Our screens safeguard the operator against these troubles.

Leaden panels are finished in pantasote—a handsome piece of furniture.

Plate No. 287.



THE KELEKET TRANSPORTABLE COIL.

Price As Illustrated (without Tube), \$250.00.

This Coil Combination is fitted with a single cell rectifier and Wehnelt interrupter so arranged that it can be used on either direct or alternating current. It is a very powerful coil capable of making pictures of adult hips and spines with but a few seconds exposure. For shipping the heavy case fits over the apparatus very much the same as the cover to a typewriter, a heavy metal rod passes through the cover and base, being held in position by a padlock. The apparatus can be packed for shipping in five minutes. Total shipping weight, 275 lbs.

Plate No. 288.



THE **CROSSE FLAMME** COIL

Mounting No. 1.

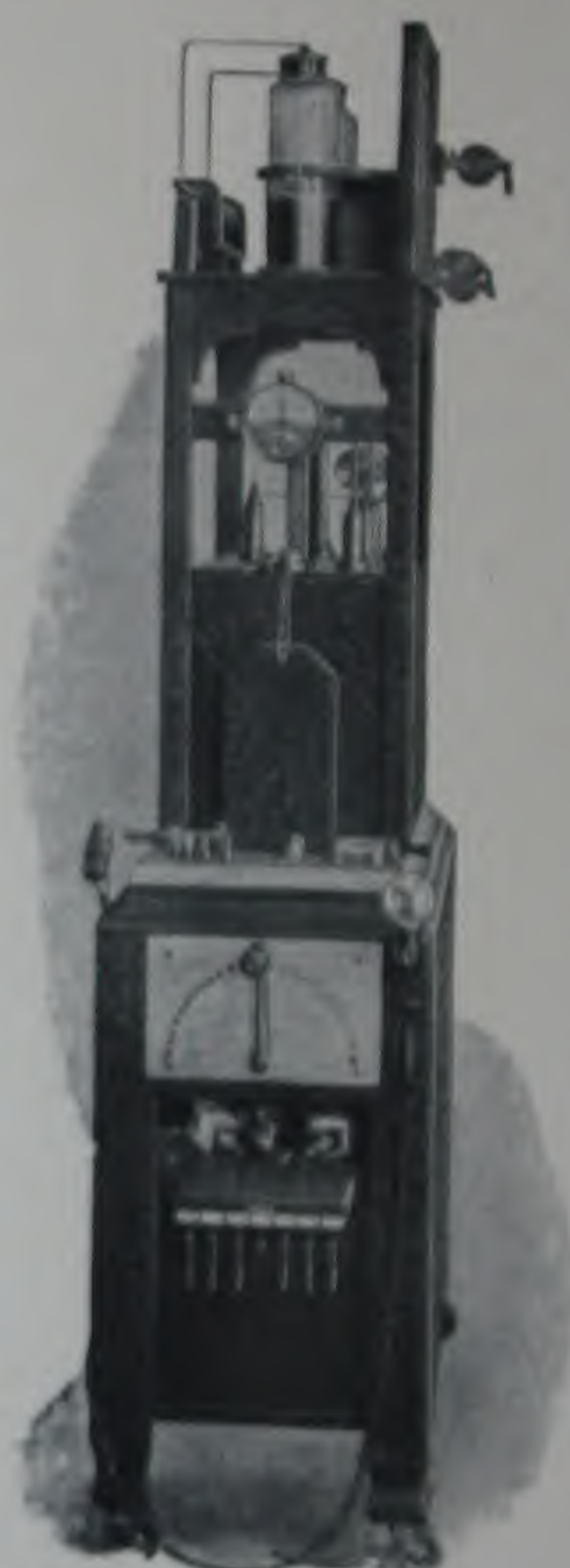
Direct current,	\$300 00
Alternating current, (one valve)	315 00

Plate No. 289.



FRONT VIEW. Our Protective Screen as shown in Plate No. 286 should be used with this mounting.

Plate No. 290.

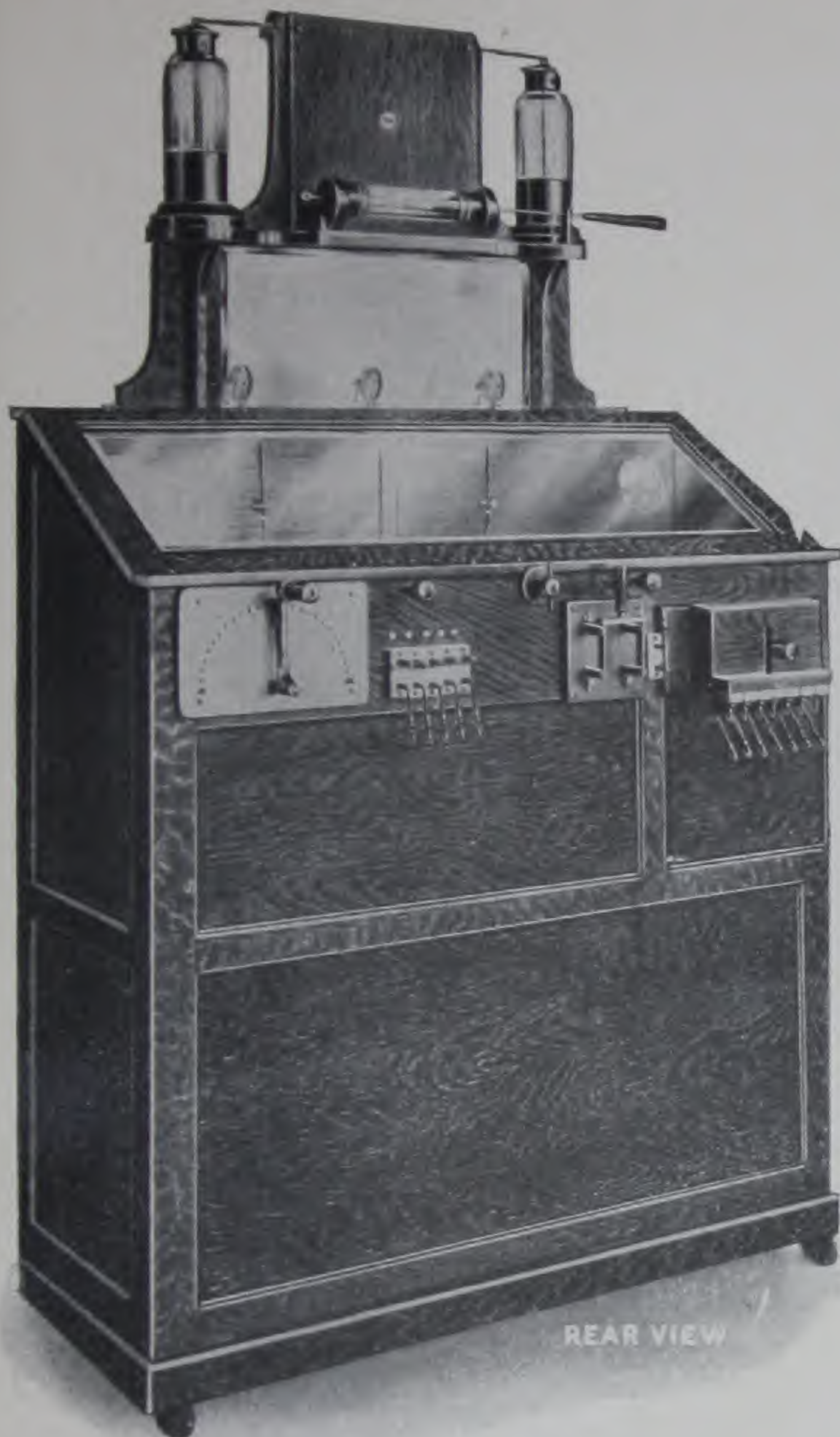


END VIEW. Showing convenient and practical arrangement of switches and meter.

TOP RESONATORS FOR MOUNTING No. 1, \$50.00

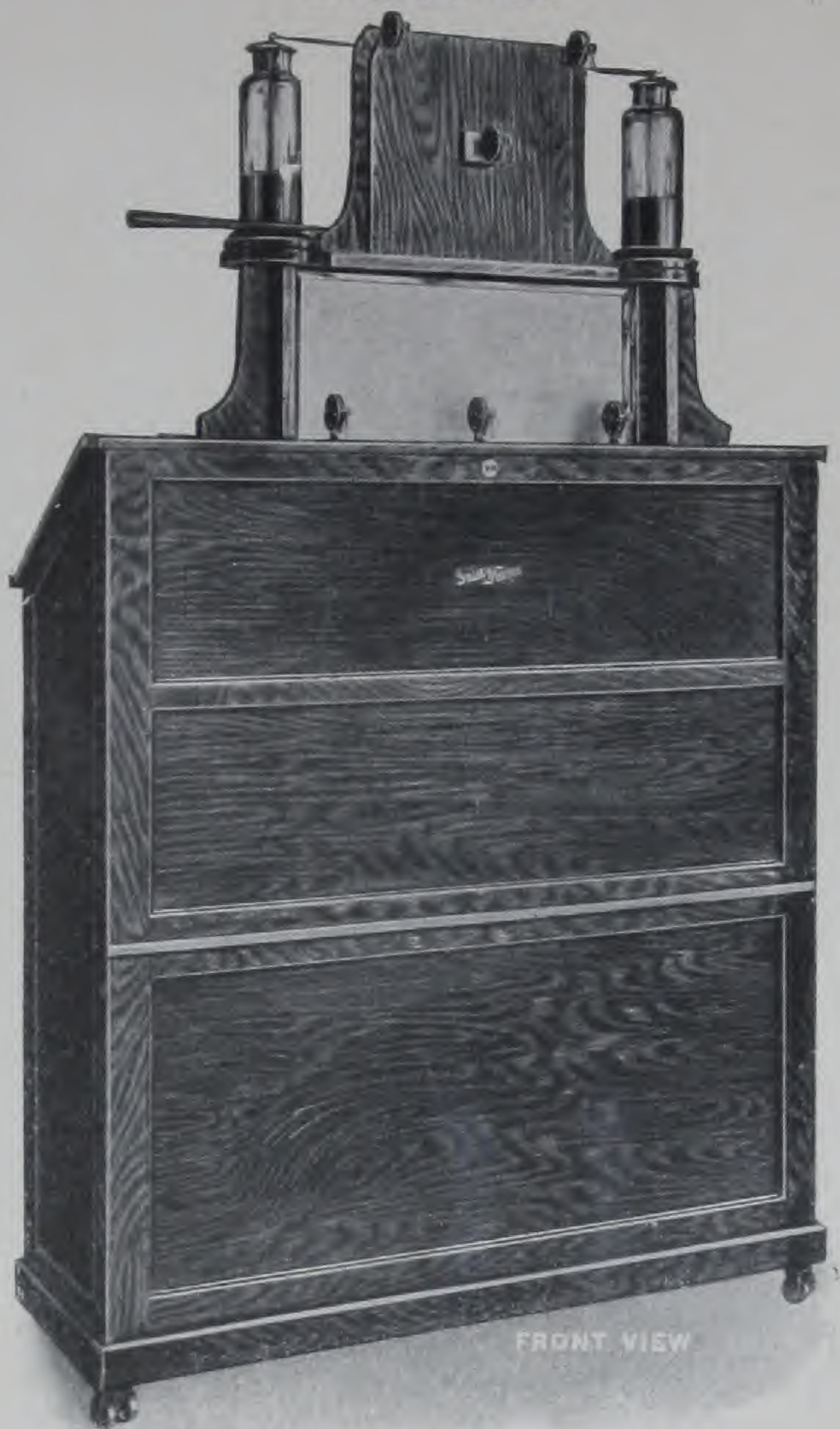
This is the same as our Grosse Flamme Mounting No. 1 with the High Frequency Resonator Mounted on top. The arrangement is most convenient and appeals especially to operators having limited floor space.

Plate No. 291.



REAR VIEW

Plate No. 292.



FRONT VIEW

THE GROSSE FLAMME COIL, X-RAY PROOF CABINET MOUNTING.

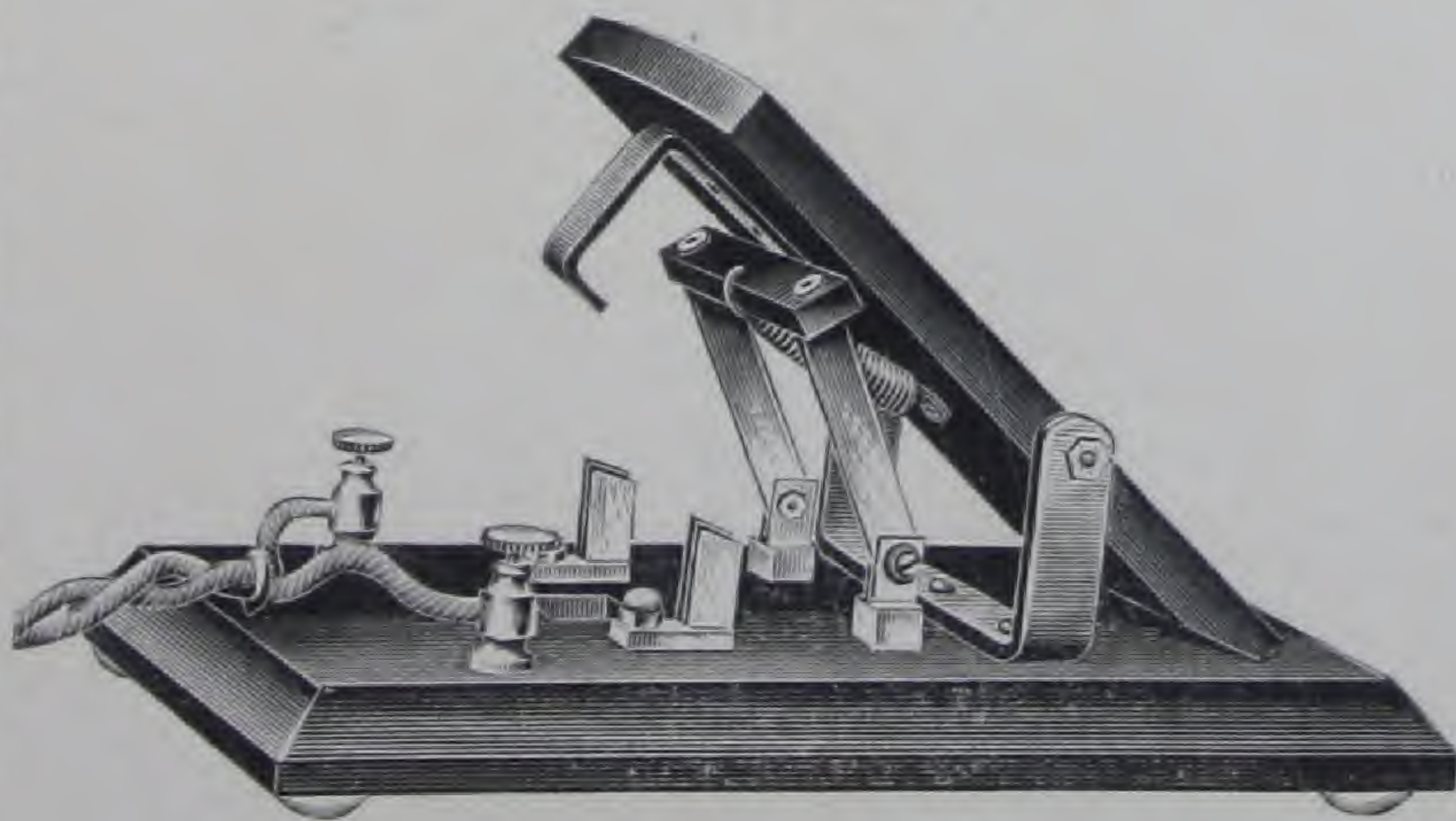
The aim of science is constantly to make the road shorter and surer. The above illustrations represent our very latest Roentgen Combination which we believe to be as nearly ideal as is possible to make such an instrument. It possesses the following most important features of merit:

- 1st: It is extremely compact, occupying a floor space of but 20 by 50 inches.
- 2nd: Its design is as plain and its finish as rich and elegant as is that of your piano.
- 3d: The Cabinet itself is proof against the X-Rays, thereby solving the problem of permanent protection to the operator without being bothered with screens, booths, etc., which are always more or less in the way and inspire distrust on the part of your patients.
- 4th: Convenience of switches and interrupter, the latter being readily detachable without stooping.
- 5th: In picture making, the switches, tube and patient can be observed by looking straight ahead, not sidewise.
- 6th: All meters and other delicate parts are protected by the glass top cabinet.
- 7th: The sparking of the coil takes place within the cabinet, thereby avoiding fright to nervous patients.
- 8th: Easy to install, as the instrument is shipped fully assembled; the services of an electrician will not be necessary.

Write us today for particulars.

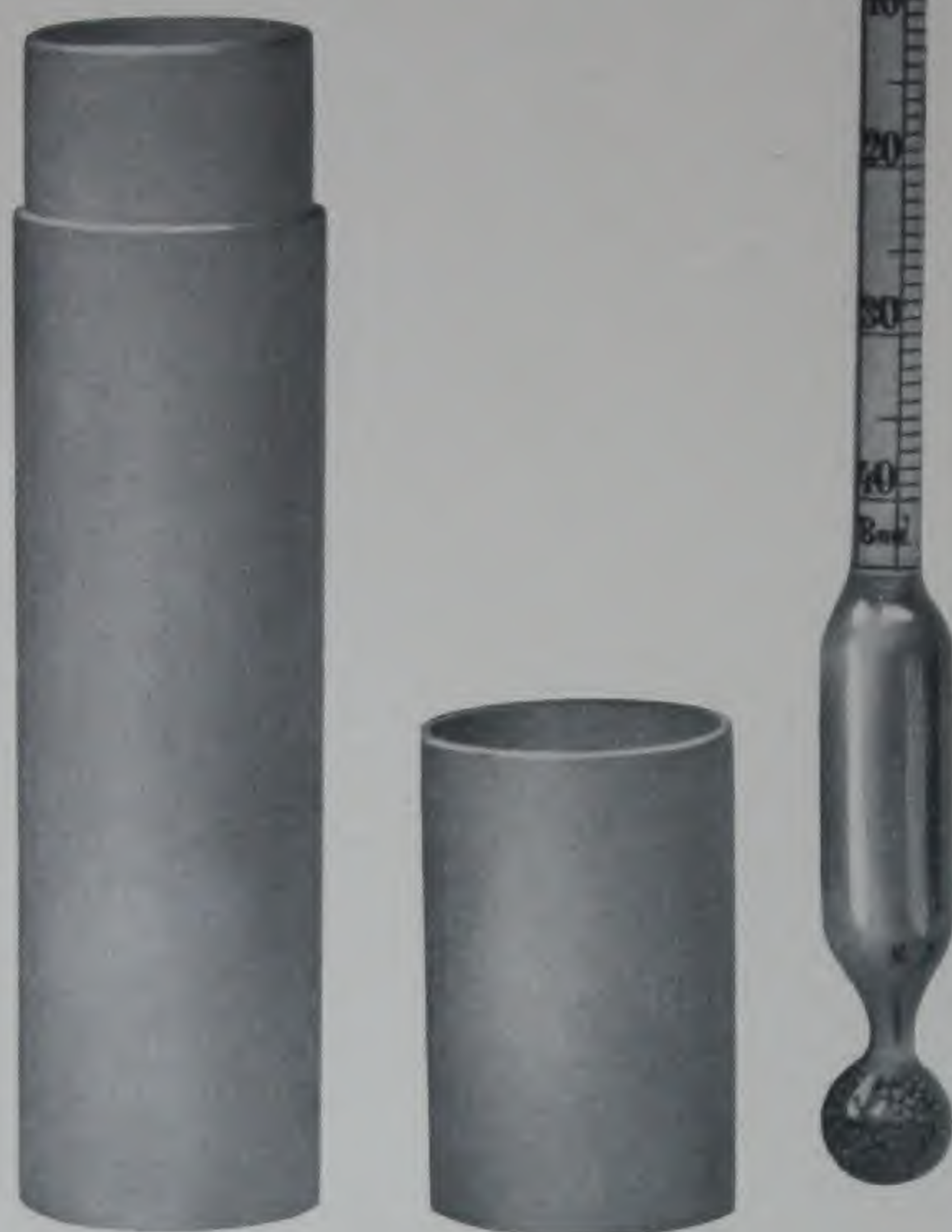
Price without Interrupters or Meters, \$300.00.
Add \$40.00 for Resonator if required.
Interrupter and Meters as per selection.

Plate No. 293.



Foot Switch, \$4.00

Plate No. 294.



THE K-K ACID HYDROMETER designed especially for testing the strength of acids in Electrolytic Interrupters. Price by mail, postpaid, \$1.00 each.

Plate No. 296.

Porcelain tubes for K-K Electrolytic Interrupters. Sizes, 17, 12 and 8, B. & S.

Price, \$2.25 each.

In ordering porcelain insulators, don't fail to designate the size required.

When ordering, or writing for information concerning any article listed in this catalog, simply mention the number of the cut and give the type initial. Don't mutilate this catalog by tearing out illustrations.

K-K PLATINUM POINTS

For Electrolytic Interrupters are made in three sizes, Nos. 17, 12 and 8, B. & S.

We use about $2\frac{1}{2}$ in. solid gold in attaching these platinum rods to their leaden and copper support. We use approximately an equal amount of platinum on all points, as the thin ones are longer than the larger sizes. These points are patented and sell at a uniform price of \$7.50 each, for either size.

Plate No. 296.

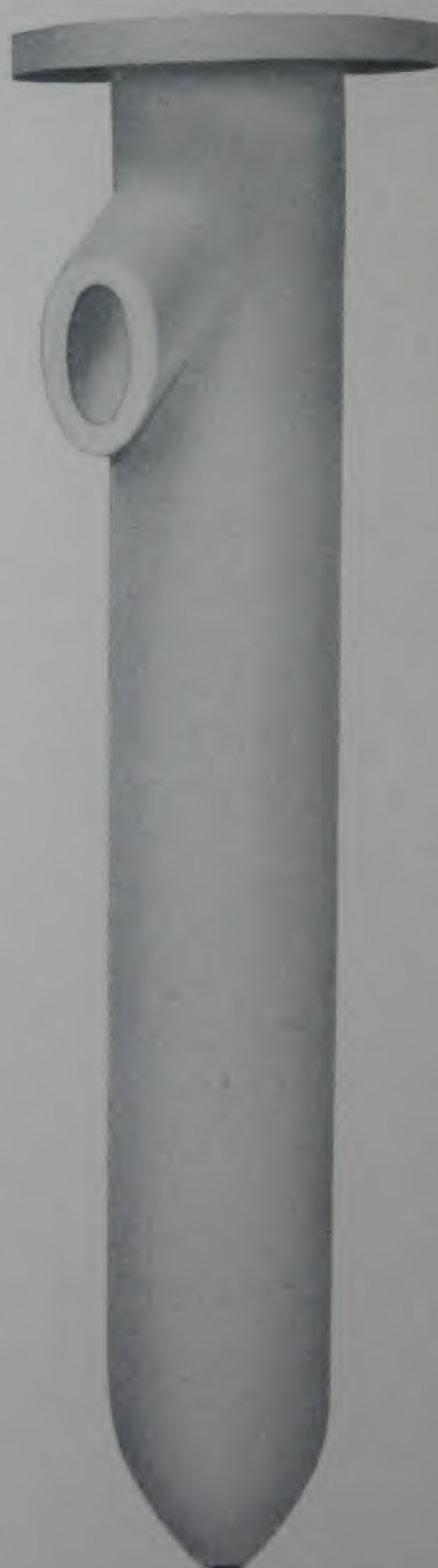


Plate No. 295.





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